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STATE OF NEW JERSEY

REPORT

DEPARTMENT OF LABOR

1920

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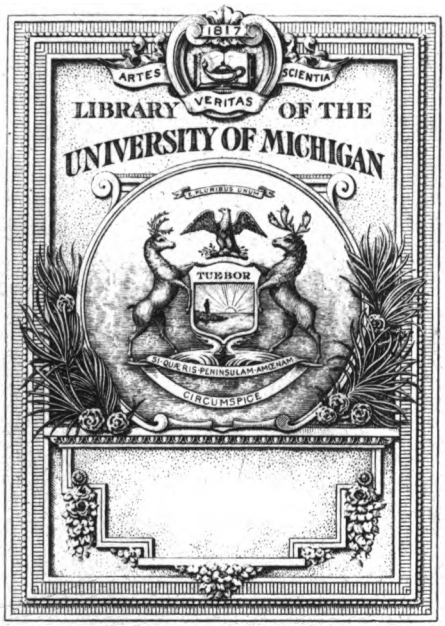

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REPORT

OF THE

Department of Labor

JULY 1, 1919, TO JUNE 30, 1920

LEWIS T. BRYANT
Commissioner of Labor

Dup. 1921.
D. of D.

TRENTON, N. J.
PUBLISHED BY THE STATE
1920

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REPORT

TRENTON, N. J., June 30th, 1920.

Hon. Edward I. Edwards, Governor, State of New Jersey:

SIR—In presenting the annual report of the Department of Labor for the fiscal year beginning July 1st, 1919, and ending June 30th, 1920, an effort has been made to condense into as few pages as possible the record of activities which are now recognized as an integral part of the industrial life of the State. Owing to the fact, however, that the growth of the technical Bureaus of the Department has kept pace with the tendency to specialization characteristic of all administrative and productive organizations, it is difficult to avoid a certain amount of statistical detail if even an outline of the year's constructive work is to be covered.

Although alive to its responsibilities during the crisis of the war, the personnel of the Department has been called upon during the past twelve months to meet an even more far-reaching test of its usefulness to the State. Since the administration of the labor laws of New Jersey is based upon the spirit of co-operation rather than of mandatory authority, the period of readjustment following the armistice has emphasized the need for an intelligent appreciation by those responsible for industrial safety and welfare of the problems affecting the relations of the employers and the half million wage earners of the State.

In view of the mounting production costs and steadily increasing overhead now borne by New Jersey's manufactories, the Department has endeavored to concentrate upon its policy of physical conservation, with a view to reducing the major financial wastage of the labor turnover. While without authority as to the wage-scale, and only directly concerned in the case of women and children with the question of hours, the Department, nevertheless, touches industry at one of its most vital points, viz., the safety, stability, contentment and consequent efficiency of the man upon the pay-roll.

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In carrying on a campaign of education as to money losses inseparable from shifting of labor forces, the Department has had the fullest co-operation from those identified with the larger manufacturing plants of the State. That an injured employee, or one made ill by the nature of his work, is a liability rather than an asset, has been generally conceded from the financial standpoint as well as the humanitarian, but the real costliness of the substitution of new workers for old measured in terms of injury to equipment, waste of material, slowing down of output, liability to injury, and shop friction, is a more recent discovery of the industrial engineer, and one which often swings the balance of profit or loss among the 7,100 firms now listed in the Department's files.

That there may be other questions than those of wage, and how undermining these may be to the foundations of a stable and efficient force, has been the official propaganda of the Department's field staff during the year just brought to a close. It is confidently believed that the establishment of the new State Industrial Safety Museum to serve as a clearing house for the Department's standardization of working essentials and safe practices in productive industry marks the most practical evidence offered to the employers of New Jersey of the services they may count upon in their labor problems from the engineers and experts of the Department's staff at Trenton.

From its early function of exercising police powers for the protection of minors and the control of flagrant violations of safety in regard to machine and fire hazards, the Department of Labor has developed into one of the highly technical branches of the State administrative service. Every detail connected with the organization and conduct of a manufacturing process finds some correlated record of advisory service in the correspondence files of the Chiefs of Bureaus, and in the reports of the Department's staff of inspectors. The questions of structural engineering, plant layout, provisions of safety and health, elevator hazards, fire protection, electrical equipment, scientific illumination of working premises; natural and mechanical ventilation; welfare provisions; control of dust, fume and heat;

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steam boiler hazards; mechanical equipment and safeguarding; the supervision of mines and quarries and high explosives; employment service; workmen's compensation; the rehabilitation of injured citizens by means of the latest types of surgical clinics; the organization of safety locals, and a comprehensive lecture service for the reduction of industrial and public accidents and fire losses, are all now included in the field covered by the Department's executives in its effort to lessen waste and industrial friction in some 7,100 New Jersey plants, factories and mills.

Wide as is the range of its newer duties, the Department, nevertheless, feels that the coming year promises an even greater scope of opportunity for usefulness to the employers and workers with whom it will come in contact. It has already established its value as a conservative factor in the most critical period of our industrial history. It is now working with the goal in view of developing one of the most constructive programs of service yet attempted in this or in any other State.

STATE CONSERVATION CAMPAIGN.

The most notable development of the Department's conservation policy during the past year has been the establishment of a State Industrial Safety Museum at its headquarters, 571 Jersey avenue, Jersey City. In a building admirably constructed for the purpose, there is being installed one of the most comprehensive machine safeguarding, fire prevention, lighting and industrial relations and welfare exhibits in the country. These, in conjunction with workmen's compensation hearings, and a rehabilitation clinic and employment service under the same roof, together with an auxiliary safety local lecture service throughout the State, promise unique facilities for this first clearing house for the reduction of State industrial and public accident and fire losses.

The broadest interpretation is now given by the Department of Labor to its obligations to safeguard the lives and property of the citizens of the State. While its jurisdiction is technically limited to the welfare and safety of the employee during his hours of service, experience has demonstrated the fact that safe

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practices are developed only by twenty-four-hour process of education in the plant, the school and in the community. The machine may be stalled by an accident due to carelessness on the street as well as in the shop. The fire hazard due to ignorance or negligence in the home has also cost our manufacturers millions, and thrown thousands of operatives out of work. If there is to be an effective effort to lower living costs to the public, which, in the last analysis, pays the overhead of insurance and compensation for the annual money losses in New Jersey because of preventable fires and accidents, there must be a State-wide movement for safety education along co-operative industrial community lines.

While the seriousness of industrial community losses through preventable fires has been widely discussed, few realize that New Jersey is pre-eminent not only in this country, but abroad, for this type of destruction of property-values. The per capita money loss from conflagration in the State for 1918 is estimated by the National Board of Fire Underwriters at $7.95, in contrast to New York's per capita loss of $3.38, and Pennsylvania's per capita loss of $2.18. The total for 1918 for New Jersey's fire-waste is placed at $24,510,819.00; the second largest State loss reported for the United States, and an increase of $14,401,-060.00 over New Jersey's record for 1917. The fact that our State displayed a fire loss increase of about 140 per cent. is due primarily to the item of exposure, and while this must be reckoned as largely due to the hurried construction of the war period and increased explosion hazard, it nevertheless indicates what is becoming a national menace—indifference to safe practices in the operation of a wide range of buildings which are dependent upon electricity for lighting and motive power. The losses in this case are due to individual carelessness on the part of employees either in erecting or in operating, and, as in the case of industrial accident, the education of the public as to the serious consequences of personal carelessness is becoming both a community and State duty.

Second to fire losses in the waste of funds during the past year must be reckoned the fatalities and injuries reported to the Work-

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men's Compensation Bureau. The settlements listed for the year cover 15,557 non-fatal accidents, involving the payment of $2,038,607.59, with the further gratuitous payment of $36,380.85; and 229 fatal cases, calling for burial costs of $32,161.17, and total payments to dependents of $606,184.88, supplemented by gratuities totalling $5,978.33.

The amount paid in actual compensation represents but a fractional part of what the community and industry must assume as a financial burden under the heading of lost time, decrease of production, increased labor turnover, as well as the creation of dependency both on the part of the injured worker and his family. How serious this by-product of the industrial overhead has become is recognized by the overwhelming majority of plants which are co-operating to the fullest extent with the work of the Department's engineers in the elimination of mechanical hazard on their premises, but, as in the case of the fire hazard, a heavy percentage of injury is due to personal negligence, and the necessity for a campaign of education among adult workers and throughout the public school system where the habits of the workers of the future are being formed, is becoming increasingly necessary.

The third loss to the State which is admittedly due in large measure to disregard to safety practices comes under the heading of public and home accidents, which are steadily increasing in the State. The use of the automobile is largely responsible for the mounting curve of the public accident chart, but the safety campaigns of industrial centers in other States have proved that public accidents, as well as industrial and fire losses, are largely affected by the indifference to safe practices manifested by the average pedestrian.

Since the State is experiencing losses reckoned in terms of millions from all three causes, the Department of Labor feels it is not justified in limiting its Safety First Campaign merely to the workroom and factory yard, and that in the organization of Safety First Locals (under the auspices of the Industrial Safety Museum described in detail later in the report) it is fulfilling a duty to the industrial citizens of the State in giving the widest publicity to the means of prevention which may lessen losses from these causes.

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FIRE PREVENTION.

Fire still remains a constant hazard in industrial plants and must therefore be listed as the first concern of those responsible for factory safety. However great the importance attached by the Department to the sanitary and welfare standards operative in industry, it has in no way lessened the duty resting upon both employer and employee for the enforcement of the most stringent regulations concerned with the prevention of fire hazards within the walls of the productive plant. The questions of egresses and fire drills are still featured in every report made by the inspection forces in the field, and the standardization of fire alarm systems is still a matter of concern to those responsible for advice relative to layout and operation of factory premises.

The Department of Labor is co-operating to the fullest with the National Board of Fire Underwriters to make the year 1920 show a marked decrease in the phenomenal fire losses of the past eighteen months. Through the Factory Chief movement instructions are being furnished to the factory chiefs, foremen, and superintendents of New Jersey plants, covering good housekeeping, elimination of extra hazardous conditions, and the organization of fire drills and fire brigades.

By means of Safety First Locals under the auspices of the Industrial Safety Museum, special meetings will be held to cover every phase of the fire hazard not only in industrial establishments, but from the standpoint of the community. It is also hoped by means of public accident reduction and safety campaigns being conducted through the public school systems to interest all classes of citizens in safe practices which will tend to check the spirit of individual carelessness responsible for the overwhelming majority of factory fire losses.

PROTECTION OF WOMEN.

The Department again calls attention to the difficulty experienced in discovering violations of the ten-hour law where there is an agreement between the employer and employee to render the investigations of our inspectors futile, and, as in the report

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of last year, urges a prohibition of employment of women for more than a specified number of hours within a given maximum of hours, thereby eliminating all opportunity for an undue amount of overtime.

The whole question of the protection of women in the State of New Jersey shows no advance over the status which has existed for some years past, in contradistinction to the general trend of legislation in competing industrial States where the shorter working hour for women has proved itself of economic value. The Department can but repeat its appeal of the past five years for investigation by our Legislature of the sound arguments advanced throughout the East and Middle West for the legal curtailment of the ten-hour law as being out of harmony with the best standards of competitive industry. The nearly uniform decrease of the working day has been the result of experience as to better timekeeping and preservation of physical efficiency evidenced where the weekly tax upon the woman operative has been reduced. Since the war's excessive demands upon women's vitality, we have authoritative data to prove that the reduction of the workday need not be attributed either to false sentiment or indifference to the best interests of the manufacturer or employees.

New Jersey still adheres to its schedule of ten hours a day, or a total of sixty hours a week, including night work. Investigation of the laws now operative throughout the country will show that only the Southern States still retain this evidence of old-time employment standards.

REPORT OF SUITS FOR TEN-HOUR VIOLATIONS.

During the fiscal vear July 1, 1919, to June 30, 1920, we brought three suits for violations of Chapter 216, Laws of 1912, covering the hours of employment for women. A fine of $150.00 was paid in settlement of the three violations, and a check for this amount forwarded to the Treasurer.

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HOME WORK LICENSES.

During the past year the Department has received 198 applications for licenses to perform home work, in accordance with Chapters 176 and 229, Laws of 1917. Investigation has been made of the condition of the premises in which these licenses were desired, which has resulted in the issuance of 188 licenses to carry on home work for a period of six months. We found it necessary to turn down 10 applications for home work for the reason that the places and conditions were not fitted to perform such work. For three months we were successful in obtaining the services of a young woman who came highly recommended to make inspections of the premises of the applicants. She made a careful study of conditions, and with great regret we were compelled to discontinue her services on account of lack of funds.

ANNUAL REPORT BUREAU OF STRUCTURAL INSPECTION AND BUREAU OF EXPLOSIVES.

Fiscal Year July 1st, 1919, to June 30th, 1920.

CHARLES H. WEEKS, CHIEF.

The activities of the Bureau of Structural Inspection for the past year have consisted of examining and approving plans and specifications for new industrial buildings, alterations and additions to factory buildings, fire escapes, fireproofing, elevators, stair enclosures and structural changes; collecting of fees for the examination of plans; checking up general inspection sheets insofar as structural items and violations are concerned; following up outstanding orders covering violations coming under the supervision of this Bureau; furnishing information and instructions to architects, building contractors and factory owners on new buildings and proposed changes to manufacturing plants. This information was furnished at our Trenton, Camden, Newark, Paterson and Jersey City offices. Hearings were also arranged for at these offices in reference to structural violations.

This Bureau has entire supervision over the nineteen field inspectors of the Department, outlining to them each week their

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duties for the following week. The Bureau is in constant touch with all branches of the Department, so as to keep the inspectors well informed as to the different matters which arise from time to time.

The different Bureaus of the Department furnish this Bureau with memorandums outlining what they desire the inspectors to follow up, and these memorandums are given careful attention and placed on the itineraries of the different inspectors to the best advantage. Hazardous and dangerous buildings, as well as all complaints, are always given preference when arranging the inspectors' assignments.

The follow-up system adopted by the Bureau is kept active and as near up to date as possible. With the limited number of assistants in the Bureau and the continued increase in activities, we have been unable to keep the system strictly up to date. Nevertheless, at the present writing, it is within a few months of the current date.

The work of the Bureau of Structural Inspection has, during the past year, been taken care of by a chief office assistant and one stenographer, who have performed their duties in a very satisfactory manner.

In addition to what has been outlined, the Bureau has been called upon to make several investigations of unsafe scaffolding. Under the requirements of Chapter 168, Laws of 1917, it is the duty of the Commissioner of Labor to investigate all complaints on unsafe scaffolding placed before him and to use every endeavor to make same comply with the requirements of said chapter.

We are pleased to report that after an investigation of a complaint in connection with scaffolding in one of our large shipbuilding plants, we were able to remedy the conditions and received notification from the complainants that improvement had been noticeable and the scaffolding more safely protected. We have also been able to secure results in connection with other complaints.

It is our intention during the coming year to prepare a scaffolding specifications which will help contractors, builders and

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other people using scaffolding, to provide safer construction, thereby reducing the number of accidents in connection with scaffolding.

The Chief of this Bureau has been called upon by the Acting Director of the New Jersey State Rehabilitation Commission, to lay out and prepare plans for rehabilitation clinics in Newark, Jersey City and Camden. The work in connection with the Newark Clinic has been completed, and the work in connection with the Jersey City and Camden Clinics is now in course of construction. The Commission has approved the work in connection with the Newark Clinic, stating that the layout and construction has been accomplished in a manner satisfactory to them.

The Bureau has also arranged for all the alterations and changes necessary in the different Department of Labor offices throughout the State, and has rendered considerable assistance in having these repairs and alterations made at the lowest possible cost.

It is a great pleasure to report the amount of work accomplished by the Bureau in connection with plan examining during the past year, which has been a record year for industrial building operations, and it is encouraging to report that we have not recorded a single complaint of any character from any person interested in building operations.

During the year this Bureau has received 937 plans for examination; 456 being for new manufacturing buildings; 80 for alterations to manufacturing buildings; 123 for the erection of fire escapes; 7 for alterations to fire escapes; 2 for fireproofing of windows and doors in connection with fire escapes; 107 for new elevator installations; 24 for the alterations of old elevators; 10 for stair enclosures; 21 for new bakeries and 7 for alterations to bakeries.

The number of new building plans received is the largest recorded for any one year. The nearest to this number was in the year of 1916 when 319 were received. Last year there were 179 received.

The total valuation of plans handled and approved by this Bureau during the past year amounts to $20,024,697.70, consist-

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ing of $18,572,947.50 for new buildings, $510,580.20 for alterations to buildings; $58,829.00 for fire escapes; $1,450.00 for alterations to fire escapes; $5,221.00 for fireproofing; $857,214.00 for new elevators; $13,308.00 for alterations to elevators and $5,148.00 for stairs and enclosures.

The revenue received by the Bureau for plan examining for the year was $2,566.50, consisting of $1,514.00 for new buildings; $243.00 for alterations to buildings; $194.00 for fire escapes; $9.00 for alterations to fire escapes; $31.00 for fireproofing; $520.00 for elevators; $39.00 for alterations to elevators, and $16.50 for stairs and enclosures.

The tabulation at the end of this report will probably bring out the above figures more clearly.

The Bureau of Structural Inspection has conducted 400 hearings at our offices in Newark, Jersey City, Paterson and Camden. These hearings were made necessary to decide on plans in connection with which there was some doubt; calling before us of delinquents having violations in their buildings in reference to which our inspectors were unable to obtain results; and hearings made necessary by complaints received at our Trenton office.

It is very encouraging to report that all hearings conducted brought us the desired results so that it was unnecessary for us to resort to legal proceedings in any case, excepting that in one instance papers were prepared for the closing of a building in Jersey City, but it was finally found unnecessary to close the building for the reason that the owners immediately took action to protect the building to comply with the law and the orders issued by this Department.

During the year the Bureau received 5,718 communications which resulted in the writing of 5,213 letters, all of which were pertaining to work coming under the supervision of the Bureau, and does not include any circular letters or notices.

In connection with the portion of the work of this Bureau pertaining to the supervision of the nineteen factory inspectors, wish to state that their work is very carefully followed up, and if at any time there are any important matters coming before the Department after the inspectors' itineraries have been released,

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the inspector interested is immediately notified to take care of whatever important items may be at hand, instead of some of the less important matters appearing on the itinerary.

At the close of the fiscal year, there was a total of 7,109 manufacturing plants in the State of New Jersey, which are divided among seventeen factory inspectors. Our records show that the inspectors have been assigned to 8,815 regular assignments, but have actually made 17,121 visits. The 8,306 more visits than assignments are accounted for by the inspectors visiting different plants in the locality to which they are assigned. This is made known to the Bureau by being noted on the summaries returned by the inspectors. It is also shown that 4,353 general inspections have been made of manufacturing plants; 3,491 inspections on reported compliances and 1,604 inspections relative to cancellation of orders. You will find a detailed report of the assignments and visits by districts in the recapitulation at the end of the report.

The annual reports of the different inspectors show that the general conditions in manufacturing plants are very much improved and fire hazards have been greatly reduced, but there still remains the importance of keeping in close touch with all the manufacturing plants relative to housekeeping, cleanliness, keeping aisle spaces, stair and fire escape approaches clear and free from obstructions.

We feel that about 90 per cent. of all factory buildings in the State of New Jersey are safely covered, but we do not want to impress upon anyone that the factory buildings are all so safely protected that there is no need of further visits to these buildings by our inspectors. Conditions in manufacturing buildings change continually, especially in buildings occupied by different tenants, and they all need the most careful supervision by our inspectors.

I am giving below copies of our inspectors' reports which may be of interest:

District "A"—Inspector William Baird, Vineland, in charge, covers the lower part of the State, extending to Camden County, and includes Cape May, Salem, Gloucester and Cumberland Counties. The District contains 284 Manufacturing

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plants, the principal industries of which are glass, foodstuffs, shoes and canneries. The Inspector has been assigned to 1,034 regular visits and has made 1,225 visits. Mr. Baird also covers the bakeries and confectionery establishments in his district, and has made two magazine inspections. The following is a copy of his report:

"In reference to my annual report to the Bureau of Structural Inspection, would say that I have had the best treatment from the manufacturers and they are willing to co-operate with the Department of Labor in its work. In the four counties I cover, I have only ten structural orders that have not been complied with, and in each case they have been granted an extension of time on account of improvements and changes. They are not hazardous places. The buildings are all in good condition in this district, except one or two, and I am following them up closely. I have one fire protection order that I have not followed up, as I could not get to it at the time specified. I have no suggestions to make for the improvement of the Bureau of Structural Inspection. I think the Bureau has done good work and helped the inspectors with their work a great many times, and I want to thank you for the assistance that you have given me."

District "B"—Inspector Henry Kuehnle, Egg Harbor City, in charge, covers Atlantic and Camden Counties, and contains 387 manufacturing plants, the principal industries consisting of the manufacture of foodstuffs and textile mills. The inspector of this District has been assigned to 766 plants and has made 823 visits. The following is a copy of Mr. Kuehnle's annual report:

"In regard to my annual report, beg to say that the treatment accorded me by the manufacturers in my district has always been very pleasant and it is the evident desire of the owner or manufacturers to co-operate with the Department to the fullest extent. The hazards in fire protection are entirely eliminated, and the general conditions have been wonderfully improved for the betterment of the employees."

District "C"—Inspector James Tallon, Trenton, in charge, covers Burlington, Mercer, Hunterdon, and small sections of Warren and Somerset Counties. This District is composed of 489 manufacturing plants, the principal industries consisting of potteries, rubber mills and oilcloth manufacturers. This inspector has been assigned to 729 plants and has made 1,308 visits. Inspector Tallon has made four inspections of

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magazines storing high explosives, under the direct supervision of the Chief of this Bureau. Mr. Tallon also covers the bakeries and confectionery establishments in most of his factory territory. The following is a copy of Mr. Tallon's annual report:

"Some wonderful improvements have taken place in my district during this year by the erection of new factories, new additions, changing of stairways, new fire escapes, re-enforcing old fire escapes, fireproofing, changing doors, enclosing stairs, providing floor spaces, passageways to stairs, fire egresses, fire lining of stairs, handrails, standardizing old elevators, installing new elevators, etc. The factory owners have shown the greatest spirit of co-operation during the year in all this work, and in every instance have given great praise to our Bureau of Structural Inspection for the assistance rendered in their behalf in helping them produce better results with a small expenditure of money, which expenditure is more than covered by the decrease in their insurance rates and as this is a fact in my district, I wish to say that the results I have obtained I owe to the instruction received from the Chief of the Bureau of Structural Inspection for the great care with which he has handled my recommendations.

"I do not think there is a fire hazard in my district with the exception of one. I, however, think that the violations in this instance will be removed shortly. While I make the statement that no hazards exist, there is no one who can say when life is safe. It is very important that fire protection inspections are made, and while the law requiring proper egresses is very necessary, it must be borne in mind that the handling of chemicals, explosives and inflammable material must also be considered with the greatest of all dangers.

"There are buildings in my district where the escape would never be used in case of fire, and there are others protected only as required by law. I would suggest that the inspection sheet for every factory contain the information as to whether or not explosives or inflammable materials are used. This would give the Bureau of Structural Inspection the information that would, to my mind, be of great importance in determining whether or not the orders recommended were sufficient.

"I have received wonderful co-operation along these lines in my district, and wish to state that not one dollar spent by the owners of these buildings has been unnecessary, and in every case, it has made the building worth a dollar more and the factory owners have agreed to this."

DISTRICT "D"—INSPECTOR FRED REARWIN, TRENTON, in charge, covers Ocean, Monmouth and Middlesex Counties and contains 590 manufacturing plants. The principal industries in this District are chemicals, cigars and wearing apparel. The District includes the coast resorts, which has compelled the inspector to keep very active in following up new concerns locating in these places. On account of the number of small concerns

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using so little machinery, a building can be equipped and placed in operation over night, which makes it very difficult for an inspector to keep advised when a building is to be occupied for manufacturing. Mr. Rearwin has done very well in taking care of these new plants and reports that his greatest difficulty is when a plant is placed in operation before first taking it up with the Department of Labor and it is necessary to have a number of changes made to make the building comply with the law. The Inspector of this District has been assigned to 334 plants and has made 1,306 visits. He has made 18 inspections of magazines storing high explosives, under the direct supervision of the Chief of this Bureau. The following is a copy of Mr. Rearwin's report:

"I am pleased to report that in 95 per cent. of the cases where structural items have been recommended by me, I have received the hearty co-operation of the factory owners and the orders covering the violations were complied with as promptly as the existing conditions governing material and labor would permit. In a few cases an indifferent attitude was taken and nothing done toward complying with the orders until the matter was taken up by me on follow-up inspections and notices sent by you that unless steps were immediately taken to complete the work called for, the matter would be referred to the Attorney-General.

"All fire escapes and stairways recommended by me have been provided or are in course of erection with two or three exceptions where the building has changed hands or delivery could not be made to date. Nearly all fire-proofing orders have been complied with. There is one that requires special attention at this time and I am keeping in close touch with this plant. I have succeeded in having a great many serious hazards in connection with elevators and elevator shafts removed. While some minor elevator violations are bound to exist at all times, there are only three plants in my district at this time where conditions are really serious.

"In all cases of new buildings and extensive alterations to old ones, I have had hearty co-operation from the architects and contractors in all structural matters. Excellent results have been obtained and nearly all structural violations removed through the excellent spirit of co-operation which has existed at all times between the Bureau of Structural Inspection and myself as Inspector of District D."

District "E"—Inspector James Stanton, Sussex, in charge, includes Warren, Morris and Sussex Counties, is being covered temporarily by Inspectors John Diviny and Augustus Munson, on account of the illness of Mr. Stanton. Mr. Stanton has been physically unable to do factory inspection work for some

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time, but it is hoped that he will soon be able to resume his duties. Before his illness, Mr. Stanton accomplished excellent results for the Department in his District, and received most hearty co-operation from all the factory owners in his District. District "E" contains 240 factory buildings, the principal industries being iron and metal manufacturing and textile mills. The work in the district has been divided between Mr. Diviny, who is in charge of Special District "J-L," and Mr. Munson, who is the Special Mine Inspector of the Department of Labor and in charge of mines and quarries which are mostly located in and around District "E." Mr. Munson also covers the factories in the places where mines and quarries are located. Both of the above inspectors are assigned to plants in Mr. Stanton's district, and in this co-operative manner we have been able to keep in touch with all the factory buildings in this District. The reports of Inspectors Diviny and Munson will appear later.

SPECIAL DISTRICT "E"—AUGUST MUNSON, DOVER, in charge, who is the Special Mine Inspector of the Department of Labor, comprises places in Warren, Morris, Hunterdon and Sussex Counties where mines are located. Mr. Munson covers the factories in the towns where mines are located, and the principal industries are of a miscellaneous character. Mr. Munson has been assigned to 127 plants and has made 565 visits. Assignments for mine work are made to Mr. Munson by the Chief of the Bureau of Mines. Mr. Munson has made twenty-two inspections of magazines storing high explosives, under the direct supervision of the Chief of the Explosives Bureau. The following is a copy of Mr. Munson's annual report:

"In my experience, I have found manufacturers in almost all cases not only willing but anxious to conform to orders issued by the Department. In fact, most of them court criticism by the Department Inspectors. As you, of course, know my work is now confined mostly to mines and quarries where I know Department work is looked upon as a great help and with most manufacturers the same feeling is becoming more and more pronounced. This I am sure is due to the fact that unreasonable and unsual demands are avoided by the Department. as every Inspector clearly understands that his recommendations must stand against criticism.

"As to hazards, you understand, of course, that they always exist to a certain extent in mines, but with time for frequent inspections, many of the usual hazards can be eliminated. I can think of no factory in my small district

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that has any distinct hazard, except one, and this I think should receive the attention of the Department. A visit by you with the local inspector I am sure would result in much good. As to criticisms of the Bureau of Structural Inspection, I have none nor do I think that the manufacturers have any. I have been treated with the kindest consideration by your Bureau, and I know that manufacturers in general have come to look to the Structural Bureau for nothing but helpful criticism."

DISTRICT "F" was in charge of the late Edward M. Hotchkiss of Newark, and includes Union and Essex Counties, with the exception of the City of Newark, and extends into Somerset County to Raritan. This District contains 449 manufacturing plants, and the industries may be termed miscellaneous. Mr. Hotchkiss was assigned to 279 plants and made 240 visits. This small number is accounted for by Mr. Hotchkiss' long illness prior to his death, which occurred on June 24, 1920. During the illness of Mr. Hotchkiss, the important matters arising in the District were taken care of by the different inspectors in the vicinity of "F" District.

DISTRICT "G"—INSPECTOR WILLIAM CROWLEY, JERSEY CITY, in charge, includes a part of the City of Newark, extending from the P. R. R. line to Newark Bay and from Market Street to the Union County line. This District contains 676 manufacturing plants and the principal industries are paints, oilcloth, celluloid and metal novelties. The Inspector of this District has been assigned to 376 plants and has made 803 visits. The following is a copy of Mr. Crowley's annual report:

"Regarding my annual report, would say that I know of no factory in my district that I would consider a serious hazard so far as structural requirements are concerned. I find that the manufacturers wish to co-operate with the Department in making their places of business as safe as possible. I have been shown the utmost courtesy by all that I have come in contact with. I have no suggestion to make, as I believe the method of calling them to the front when they appear dilatory in complying with orders has the desired effect."

DISTRICT "H"—INSPECTOR HENRY LOHSE, NEWARK, in charge, is in the City of Newark, extending from the Pennsylvania Railroad and Frelinghuysen Avenue to Irvington, South Orange, and the East Orange County line, and from Market, Bank and Warren Streets to the Union County line. This Dis-

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trict contains 707 manufacturing plants, the principal industries of which are jewelry, metal novelties, leather and general machine manufacturing plants. The Inspector of this District has been assigned to 441 plants and has made 966 visits. This Inspector has also been assigned seventeen days on placement work in connection with our Employment Service at 9-11 Franklin Street, Newark. Mr. Lohse's annual report is as follows:

"I beg to advise you that the treatment accorded me by the manufacturers in my district has been in a general way very courteous and the spirit has been to co-operate, with but few instances, and those have been the smaller manufacturers, particularly those of foreign nationality. As to hazards from a structural standpoint in my District, I cannot say offhand just how many ex ist, but there are very few, and to the best of my knowledge, they are being attended to."

District "I"—Inspector Henry Booth, Bloomfield, in charge, is also a part of the City of Newark, extending from Market, Bank and Warren Streets to Bloomfield and the Belleville County line. This District also covers Harrison, Kearny and Arlington in Hudson County, and contains 565 manufacturing plants, the industries being of a miscellaneous character. During the past year, Mr. Booth has been assigned to 549 plants and has made 859 visits. He has also been assigned eighteen days on placement work in connection with our employment office, 9-11 Franklin Street, Newark. Mr. Booth's annual report is as follows:

"I have received very courteous treatment from manufacturers generally, and have had the best of success in having orders (particularly those covering hazardous conditions) complied with, despite the high prices of labor and material. During the past year loft space has been at a premium in and near Newark, and some crowded conditions needed careful watching, particularly in the older manufacturing buildings. I am pleased to report that at this time space is not so difficult to obtain and conditions are gradually getting normal, caused, I think, by the erection of so many modern factory buildings, and the gradual giving up of the older buildings, such as could not be modernized without exorbitant expense. I am particularly gratified at the elimination of a number of very old buildings that during the war were used for manufacturing. Mostly all of the new, large buildings and a number of the older ones have been sprinkled during the past year, and this to my mind is something that will do the most toward saving life in manufacturing plants."

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DISTRICT "J"—INSPECTOR WILLIAM VAN ASSEN, PATERSON, in charge, includes the main section of Paterson and Passaic Counties, and contains 554 manufacturing plants. The principal industries in this district are silk and textiles. Mr. Van Assen was assigned to 493 plants and has made 757 visits, and his annual report is as follows:

"I am very well satisfied with the treatment accorded me by the manufacturers and mill owners in my district. With a very few exceptions, I have found the people in this district invariably ready and often anxious to co-operate with this Department in providing such protection against the fire and panic hazard as the law requires and the individual conditions warranted. A few exceptions referred to are also coming around. During the past year a large number of fire escapes have been erected in compliance with orders, stairways have been enclosed and other improvements made to prevent or retard the spread of fire. Of the ten or twelve buildings that still require fire escapes against which I have orders outstanding, six have fire escapes contracted for or being erected. With the exceptions noted, there are no extreme fire hazards in my district and these buildings cause me no misgivings with the exception of one, and the fire escape has been contracted for and will be erected in a few weeks.

"The buildings in the case of which no action has yet been taken by the owners are small two-story buildings and in no way dangerous. In the case of some of the older mill buildings, the owners themselves are making improvements not called for by the laws, but which tend to make the buildings immeasurably safer for the inmates. I refer to the installation of sprinkler systems. While improvements such as these are admittedly made for business reasons, they are of value to us nevertheless. Altogether, I am well satisfied with the progress made in my district in connection with structural and fire protection work and consider it to be in very good shape, while I can only praise the general attitude of the people here. With regard to the work of the Bureau of Structural Inspection, I can see no reason for criticism."

SPECIAL DISTRICT "J"—HENRY KLUSSMANN, WEST HOBOKEN, in charge, comprises part of the City of Paterson and extends to Bergen and Hudson Counties. This district contains 404 factory buildings, the principal industries of which are the manufacture of silk and textiles. The inspector has been assigned to 282 plants and made 1,137 visits. Mr. Klussmann is also the Special Structural Inspector of the Department of Labor, and has made a number of investigations of scaffolding and other structural complaints. Mr. Klussmann has only recently been transferred to Special "J" District, it having been formerly covered by Mr. Munson. He has also made 61 inspections of

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magazines storing high explosives, under the direct supervision of the Chief of the Explosives Bureau. Mr. Klussmann's report is as follows:

"I wish to state that my treatment ever since I entered the district has been most cordial with almost every manufacturer I encountered on any subject. I have no thought of criticism, suggestion or idea to advance at this time."

SPECIAL DISTRICT "J-L"—INSPECTOR JOHN DIVINY, PATERSON, in charge, covers Passaic, Garfield and surrounding places, and contains 356 manufacturing plants, the principal industries of which are silk and textiles. Mr. Diviny has been assigned to 513 plants and has made 1,152 visits. Mr. Diviny has also covered a part of District "E" (note District "E"). He has made three inspections of magazines storing high explosives, under the supervision of the Chief of the Explosives Bureau, and his annual report is as follows:

"In reference to my annual statement, would say that I have obtained very good results in having the structural and fire protection requirements of the Department of Labor complied with in nearly all the factories in the district which I cover. With few exceptions, the manufacturers are willing and anxious to comply with all structural and fire protection requirements of the Department. The new law requiring manufacturers to file plans and specifications with the Department, covering the erection of new buildings or the remodeling of old ones, is a wonderful help to both the manufacturer and the inspector, as it practically eliminates any hazards in the construction of a new building.

"Throughout my district in the last year we have had erected a large number of fire escapes and fire towers, also the fireproofing in connection with these fire escapes. The Department has been a great aid to manufacturers and builders in the erection of buildings and also in remodeling of buildings to be used for manufacturing purposes, by reason of suggestions and advice from the inspectors while these buildings were in the course of erection. In my district the hazards in connection with the important items of structural and fire protection violations have been removed with the exception of a few plants, and I feel that these will be removed in a short time. The number of structural and fire protection violations in manufacturing establishments that have been removed by reason of suggestions from the inspectors and orders and suggestions from the Bureau of Structural Inspection are numerous, such as making exit doors open outwardly, providing handrails on stairs, providing water pails and fire extinguishers, removing inflammable rubbish from factories, repairing stairways, floors, etc., protecting elevators and elevator shafts, openings in floors, providing metal cans for sweepings,

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rubbish and oily waste, with violations when pointed out to the manufacturer are immediately removed in most cases, as they can readily see the benefits to be derived from such precaution.

"I have in mind a couple of buildings which are of four-story frame construction, which buildings are used for the manufacture of very highly inflammable material. While these buildings practically comply with the law of structural requirements, I personally feel that if a fire should occur on the lower floor of either one of them that people employed on the upper floors would be in a great danger of being burned to death, and I think it would be a benefit to the State in general if there was a law forbidding the erection of a building for manufacturing purposes of frame construction more than two stories in height.

"I think the work of the Bureau of Structural Inspection is above criticism, as I have found them prompt and efficient in following up any suggestions of orders which I have recommended."

DISTRICT "K"—INSPECTOR GEORGE SPEIDEL, ELIZABETH, in charge, comprises the City of Bayonne and a portion of Jersey City extending from Communipaw Avenue to the Bayonne City Line. This district contains 207 manufacturing plants, the industries consisting of chemicals, oils and miscellaneous products. Inspector Speidel has been assigned to 281 plants and has made 721 visits. In addition to his regular district, Mr. Speidel is a special assistant in the Bureau of Hygiene and Sanitation, and is under the direct supervision of the Chief of this Bureau. The following is a copy of Mr. Speidel's report:

"In reference to my annual statement regarding structural and fire protection matters, also regarding the treatment received from manufacturers, would say that during the last fiscal year a considerable number of improvements have been made. These include the erection of fire escapes, fireproofing of windows, erection of new stairways, enclosing stairways in partitions of fire-resisting material, changing of doors to open outwardly, providing additional exit doors, the installation of fire doors and alterations to elevators. In way of fire protection orders, these provide for fire pails, fire extinguishers, fire hose, metal-lined bins with fusible link attachment for excelsior, metal cans for sweepings, self-closing metal cans for oily waste, etc. The greater percentage of the fire protection orders have been complied with.

"Regarding the number of hazards which to my mind exist in my district, I find it quite difficult to give you a definite reply to this question, because in my district there are located a number of large oil refineries, several chemical plants and a smelter plant, in which there are always great fire hazards.

"However, insofar as fire protection is concerned, I feel safe in saying that ninety-five per cent. (95 per cent.) of the plants in District "K" have been

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adequately provided with sufficient means of egress and are properly equipped with fire-fighting apparatus.

"As to the treatment received from manufacturers, I will say that with very few exceptions, the managers, superintendents of the various plants have accorded me courteous treatment, and in many instances, managers have expressed themselves as pleased to have me call. At the present time I have requests from two large concerns to visit their plants and take up each item contained in the orders issued to them with their safety committees. In conclusion will say that a greater spirit of co-operation is shown by the manufacturer than in the past, and with organized safety committees working in co-operation with the inspector, we can expect that factory conditions will be greatly improved during the coming year.

"I feel that the time is not far distant when all manufacturers will co-operate with the Department of Labor for the purpose of establishing safer working conditions, and comfortable surroundings for their employes."

DISTRICT "L"—INSPECTOR CROWELL HASLETT, JERSEY CITY, in charge, includes Bergen and a portion of Hudson County, and contains 359 manufacturing plants. The industries are of a miscellaneous character, but are principally oil refineries, metal manufacturing and textile mills. This inspector has been assigned to 390 plants and has made 428 visits. Mr. Haslett has only been assigned to this district during the past few months, the previous inspector having resigned from the Department. Inspector Haslett is also temporarily connected with the Bureau of Electrical and Mechanical Equipment to prepare layouts of fire alarm installations as directed by the Chief of this Bureau. Mr. Haslett's annual report is as follows:

"As I have only had this district a few months, I am not in a position to make much of a report at this time, but from the factories visited, the structural and fire protection items are generally good. There are several factories that are not in the best of condition in this respect, although I find that orders were issued on all of these by previous inspectors in the district. I find a number of buildings that were never intended to be used for manufacturing purposes have been altered for such use and some in the course of alteration. Many buildings that were formerly used for pleasure only, such as dance halls, lodge rooms, restaurants, saloons, etc., as well as dwelling houses, are making way for manufacturing. Most of these places I have discovered that the owners are entirely ignorant of the factory laws, and as the changes are being made without our knowledge, as a result they fail to provide the necessary means of egress, fire escapes, enclosing of stairs, etc.

"Up to the present time I do not believe I have visited half the factories in the district and have made very few general inspections, as I have used my time in following up outstanding orders recommended by previous inspectors in the district.

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"Due to the slump in the silk and embroidery trade, many of the smaller factories are now either closed entirely or are running with reduced force. The orders issued are as a rule being complied with, but I find in some cases it is difficult to obtain the material and help to get the work done. In other cases, they keep putting the matter off, believing that prices will come down and the work can be done cheaper later on.

"The Chief of the Bureau of Structural Inspection has a list of the hazardous buildings which were turned over to me, where it seems it has been impossible to get any action so far, and it is his intention to visit these places with me to determine just what should be done. I trust that next year I will have the situation here better in hand and know more of the district than I do at present, so that I can make a more detailed report."

SPECIAL DISTRICT "L"—INSPECTOR LYDIA E. SAYER, NEWARK, in charge, is a part of the regular "L" District, and comprises 314 embroidery factories, most of which are one-story factories. The principal violations in these plants are general welfare and child labor violations, and it was, therefore, deemed necessary to have one of our female inspectors cover these plants. Miss Sayer has been assigned to 93 plants and has made 789 visits. In addition to her regular work, Miss Sayer has been assigned twenty-one days on work in connection with our Industrial Museum of Safety at Jersey City, under the direct supervision of the Commissioner of Labor. Miss Sayer returned to the Department on October 16, 1919, after having a leave of absence to do war work. Her annnual report follows:

"Referring to my annual report in connection with the Bureau of Structural Inspection, wish to state that as all of my work during this fiscal year has been in the one-story factories in "L" District, the structural orders have not played a very important part in it. Of course, in these factories there is practically no fire hazard. The few structural orders I have had related to such minor matters as repairs to floors and changing exit doors to open outwardly. In most cases these orders were promptly and cheerfully complied with, but of course the expense involved in most cases was not large. I have one case where I asked repairs to the floor and the owner put down an entirely new concrete floor. I have found that even in the cases where a manufacturer complains when he is ordered to do a piece of work, once it is done, he is usually well pleased with it and feels that it was worth doing."

DISTRICT "M"—INSPECTOR WILLIAM SCHLACHTER, ORANGE, in charge, comprises part of Jersey City from Communipaw Avenue to and including the City of Hoboken. In this district there

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are 530 manufacturing plants, consisting of refineries, foodstuff and novelty manufacturing. The inspector of this district has been assigned to 642 plants and has made 888 visits. His annual report is as follows:

"In reference to my annual statement with reference to the conditions in my district, would say that the treatment accorded me by the manufacturers in my district in a general way has been very friendly and a spirit of co-operation with very few exceptions exists.

"I have followed up very closely the hazardous risks in my district, and find it rather difficult to state definitely the exact number there are in my district at this time for the reason that I may visit a building in the morning and before closing time of the same day, the conditions may arise that will produce dangerous hazards. A number of the different manufacturers in my district are of such a character that cleanliness, housekeeping and discipline are important factors."

BAKERY DISTRICT "A" is in charge of Joseph Seder, Newark, who has been assigned to 531 bakeries and has made 982 visits.

BAKERY DISTRICT "B" is in charge of Patrick Hayes, Jersey City, who has been assigned to 487 bakeries and has made 1,174 visits.

Both Inspectors Seder and Hayes work under the direct supervision of the Bakery Bureau, which comes under the Chief of the Bureau of Hygiene and Sanitation.

GENERAL WELFARE DISTRICT "A"—INSPECTOR LAURA W. MOORE, CAMDEN, in charge, covers Ocean, Cape May, Cumberland, Salem, Gloucester, Atlantic, Camden, Burlington, Mercer, Middlesex and Monmouth Counties, insofar as mercantile, child labor and general welfare investigations are concerned. Miss Moore was assigned to 353 plants and has made 966 visits.

GENERAL WELFARE DISTRICT "B"—INSPECTOR NELLIE H. SLAYBACK, MONTCLAIR, in charge, covers Passaic, Union, Somerset, Morris, Hunterdon, Warren and Sussex Counties, insofar as mercantile, child labor and general welfare investigations are concerned. Mrs. Slayback was assigned two days on investigating conditions in homes for the purpose of ascertaining whether or not homework licenses could be issued, and nineteen days on placement work for females in connection with our Newark Employment Service.

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Both Inspectors Moore and Slayback work under the supervision of the Inspection and Child Labor Bureaus.

During the year, the Bureau of Structural Inspection approved of the issuing of 1,020 Structural and Fire Protection orders, and in order to accomplish this, it was necessary for the Bureau to examine 4,353 general inspection sheets. The items contained in these orders were 112 Fire Escapes, 230 Fire-proofing, 1,277 Fire Prevention, 1,494 Structural Changes, 113 Elevators, and 103 Fire Escape Alterations.

It is very pleasing, indeed, to report that we have been successful in having 1,499 Structural and Fire Protection Orders complied with, consisting of 98 Fire Escapes, 202 Fire-proofing, 78 Alterations to Fire Escapes, 1,349 Fire Prevention, 279 Elevators and 1,325 Structural Changes. This has been a very successful year in the way of securing compliance with old outstanding orders.

It has been necessary to cancel 322 orders during the past year, due to the change of ownership, discontinuing business, etc. These orders consisted of the following items: 67 Fire Escapes, 133 Fire-proofing, 33 Fire Escape Alterations, 250 Fire Prevention, 450 Structural Changes, and 114 Elevators.

This Bureau has made a special effort to safeguard elevators in manufacturing plants, and we are continually placing before the inspectors the necessity of following up unsafe elevators and insisting upon a compliance with our law in every detail. We have issued orders for the alteration of 113 elevators and have succeeded in having 279 elevators altered to comply with the law. In all cases where an elevator is accepted, we issue to the owner and the operator of the elevator a list of instructions.

During the past year over 70 per cent. of the new elevators installed have been provided with fireproof semi-automatic safety doors, and a great many of these doors equipped with an interlock.

The statistical records of the Department show that there have been forty (40) elevator accidents during the year, four (4) of which have been fatal. During the year of 1917-18, seventy (70) elevator accidents with five (5) fatals were reported, and the year 1918-19 (last year), fifty-three (53) elevator accidents

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were recorded, two of which were fatal. This shows a reduction of thirteen (13) elevator accidents over last year, and a reduction of thirty (30) over the previous year.

The fatal accidents of last year were all due to gross carelessness. The first accident was caused by a boy sixteen years of age starting the elevator car and on reaching one of the upper floors failing to stop the car, but lifted the gate when the car was at the floor level, and slipped off, falling down the shaft after the car passed, by stepping backwards. This boy did not allow the gates to close properly, and by interfering with the gates, lost his life.

A man fifty years of age was crushed to death by an elevator by being caught between the elevator car and wall of shaft. There was no witness to the accident, but it appears that the man was trying to look down the shaft from the car platform and was caught by a shaft projection. This accident would not have occurred had the man kept his body within the car platform line.

The next fatal accident took place in a foundry in connection with the cupola lift. There was a track on this lift, and cars were run on the lift and raised to cupola platform, an empty car located on the cupola platform run off the platform and struck one of the men loading the lift at the ground floor level, striking him on the head, with the result that he was killed instantly.

The fourth fatal accident was caused by a man in a factory building leaning over the car platform after it had passed beyond the height of the gate, and was struck by the ceiling and instantly killed.

Had the Department of Labor instructions been followed, none of these accidents would have taken place. The non-fatal accidents were caused by falls from car, dropping of car, crushed between car and platform, caught between platform and gate, falls down shaft, and objects falling down the shaft. A complete tabulation of elevator accidents for the year is as follows:

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CAUSES.	Fatal.	NON-FATAL.			
		Permanent, Partial Disability.	Fracture.	Other Injuries.	Total.
Elevators, falls from cars,	....	.....	....	2	2
Dropping, boken cable,	....	.....	2	3	5
Crushed between platform and floor,	2	2	6	5	13
Caught between platform and gate,	1	2	3	4	9
Falls down shaft,	....	.....	3	4	7
Objects falling down shaft, hit by,	1	.....	....	.....	.....
Total,	4	4	14	18	36

The Bureau of Structural Inspection has used every effort to co-operate in making the Industrial Museum of Safety at Jersey City a decided success. We have been successful in arranging for exhibits which will demonstrate in a practical manner all items of general structural and fire protection requirements coming under the supervision of this Bureau.

Fireproofing exhibits in the way of the Department of Labor standard fireproof windows have been arranged for with the Newark Cornice and Skylight Works, Newark; The Leonard Sheet Metal Works, Inc., Hoboken; the Falstrom & Tornquist Co., Passaic, and Jacob Steinberg Co., of Newark.

Elevator displays have been arranged for by the Otis Elevator Co., New York City; Storm Mfg. Co., Newark, and the Albro-Clem Elevator Co., Philadelphia. Elevator interlock displays are to be provided for by the Shur-Loc Elevator Co., Inc., New York City; the Peelle Door Co., New York City; the LeBrocq Co., Brooklyn; the Knickerbocker Elevator Gate Co., New York City; the Elevator Supply & Repair Co., New York City; the Elevator Safety Appliance Co., Philadelphia. Fireproof doors by the Peelle Door Co., New York City, and the Variety Door Co., New York City. Fireproof material by the Porete Mfg. Co., Newark. A full standard scaffold by the Patent Scaffolding Co., of New York City, and a ladder and scaffolding display by the Chesebro Whitman Co. A safety can and bin by the McNutt

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Can Co., New York City, and the sanitary flooring by the Marbleoid Co., New York City. Also a number of smaller exhibits by different manufacturers.

All the exhibits arranged for by the Bureau of Structural Inspection will bear the approval stamp of the Department of Labor.

The Bureau of Structural Inspection is keeping in close touch with the progress of the exhibits and the installation of same, and as soon as the building is ready, we will see that the proper installations are made.

The Fire Protection requirements coming under the supervision of the Bureau of Structural Inspection consist chiefly of the providing of fire-fighting equipment for manufacturing plants, such as chemical engines, fire extinguishers; the providing of metal-lined bins, cans and other receptacles for the storage and keeping of oily materials, waste and scraps; and the arranging for the storage and keeping of celluloid, excelsior, paints and varnishes in safe receptacles and in parts of plants approved by the Bureau. It is always thoroughly impressed upon all the inspectors by the Bureau from time to time the importance of insisting on the fire protection features being given very careful attention at all times, and the importance of seeing that fire hazards in factory buildings are eliminated.

The Bureau of Explosives, conducted under the supervision of the Bureau of Structural Inspection, has had a very successful year. We have been called upon to investigate conditions in connection with the handling, storage and transporting of high explosives, and at the close of the fiscal year we find that 159 certificates of compliances were issued for the conduct of magazines in this State.

Seventeen manufacturing plants were furnished with certificates of compliances, five mines, thirty-eight quarries, fifteen fireworks companies, five construction companies, two chemical companies, and one storage company, making a total of eighty-three companies doing business in the State which requires the securing of licenses to operate magazines. There are 179 individual magazines in the State, and 159 of these having received

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certificates of compliances, there still remain twenty to be licensed.

Seventy-two concerns were reported discontinued during the year.

The Bureau has collected $2,957.00, covering license fees. The certificates of compliances are issued from October to October of each year, and consequently do not expire until next October.

The attached tabulation will show that during the past year there have been 11,900,696 pounds of explosives stored in the State of New Jersey, 38,963,600 blasting caps, and 1,215 gross of torpedoes.

The Chief of the Bureau has made fifty-one inspections of magazines during the year, and 120 inspections were made by the district inspectors under the direction of the Chief of the Bureau.

We are also arranging for an exhibit of charts, layouts and statistics pertaining to the handling, storing and transporting of explosives in the Industrial Museum of Safety, featuring the general construction of explosive magazines.

RECAPITULATION.

Plan Work.

Plans received, ... 937
Plans approved, ... 937
} consisting of

	Rec.	*App'd.*
New Buildings,	456	456
Alterations to Buildings,	80	80
Fire Escapes,	123	123
Alterations to Fire Escapes,	7	7
Fireproofing,	22	22
Elevators,	187	187
Alterations to Elevators,	24	24
Stairs and Enclosures,	10	10
Bakeries,	21	21
Alterations to Bakeries,	7	7
Total,	937	937

$2,566.50 received during the year for plan examining fees comprising the following:

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New Buildings,	$1,514 00
Alterations to Buildings,	243 00
Fire Escapes,	194 00
Alterations to Fire Escapes,	9 00
Fireproofing,	31 00
Elevators,	520 00
Alterations to Elevators,	39 00
Stairs and Enclosures,	16 50
Bakeries—See Note,	.....
Alteration to Bakeries—See Note,	.....
Total,	$2,566 50

Plans approved for building construction amounting to $20,024,697.70, as follows:

New Buildings,	$18,572,947 50
Alterations to Buildings,	510,580 20
Fire Escapes,	58,829 00
Alterations to Fire Escapes,	1,450 00
Fireproofing,	5,221 00
Elevators,	857,214 00
Alterations to Elevators,	13,308 00
Stairs and Enclosures,	5,148 00
Bakeries—See Note,	.....
Alteration to Bakeries—See Note,	.....
Total,	$20,024,697 70

NOTE.—The fees received for bakeries and alterations to bakeries, as well as the cost of the building construction, are included in new buildings and alterations to buildings.

ORDERS.

Structural Orders Issued,	1,020	Consisting of following items:
Structural Orders Complied,	1,499	
Structural Orders Canceled,	322	

	Issued.	*Complied.*	*Canceled.*
Fire Escapes,	112	98	67
Fire Escape Alterations,	103	78	33
Fireproofing,	230	202	133
Structural Changes,	1,494	1,325	458
Elevators,	113	279	114
Fire Prevention,	1,277	1,349	250
Total,	3,329	3,331	1,055

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INSPECTORS' WORK.

District.	*Inspector.*	*Assignments.*	*Visits.*
"A"	William Baird,	1,034	1,225
"B"	Henry Kuehnle,	766	823
"C"	James Tallon,	729	1,308
"D"	Fred Rearwin,	334	1,306
"E"	James Stanton,	(See Note.)	
"F"	Edward Hotchkiss,	279	240
"G"	William Crowley,	376	803
"H"	Henry Lohse (Emp. 17 days),	441	966
"I"	Henry Booth (Emp. 18 days),	549	859
"J"	William VanAssen,	493	737
"K"	George Speidel,	281	721
"L"	Crowell Haslett,	390	428
"M"	William Schlachter,	642	888
Spec. "E"	August Munson,	127	565
Spec. "J"	Henry Klussmann,	282	1,137
Spec. "J-L"	John Diviny,	513	1,152
General Welfare "A"	Laura W. Moore,	353	966
General Welfare "B"	Nellie Slayback (home work 2 days, employment 19 days),	115	52
General Welfare "C"	Lydia Sayer (Museum work 21 days),	93	789
Bakery "A"	William J. E. Seder,	531	982
Bakery "B"	Patrick J. Hayes,	487	1,174
		8,815	17,121

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VALUATION TABULATION OF BUILDING OPERATIONS FOR THE YEAR.

MONTHS.	New Buildings.	Building Alterations.	Fire Escapes.	Alt. to Fire Escapes.	Fire-proofing	Elevators.	Alterations.	Stairs and Enclosures.
July, ...	$1,142,623.00	$37,500.00	$3,750.00	.....	$1,450.00	$30,629.00	$175.00	$98.00
August, ...	1,172,614.00	18,250.00	10,330.00	$325.00	.....	2,325.00	125.00	.....
September, ...	1,112,230.00	34,300.20	1,975.00	495.00	.....	53,302.00	150.00	.....
October, ...	1,735,750.00	21,000.00	2,653.00	.....	.....	82,535.00	2,500.00	.....
November, ...	983,500.50	33,980.00	3,125.00	180.00	630.00	58,040.00	258.00	.....
December, ...	1,574,570.00	38,150.00	1,780.00	.....	613.00	222,368.00	760.00	150.00
January, ...	2,248,780.00	31,650.00	650.00	.....	1,212.00	29,000.00	290.00	.....
February, ...	1,307,492.00	30,700.00	12,444.00	.....	125.00	71,475.00	900.00	800.00
March, ...	2,678,128.00	159,500.00	6,388.00	250.00	200.00	32,290.00	5,100.00	1,700.00
April, ...	1,974,333.00	32,200.00	8,780.00	.....	874.00	84,300.00	200.00	.....
May, ...	941,826.00	63,500.00	3,084.00	.....	117.00	132,250.00	2,500.00	100.00
June, ...	1,701,101.00	9,850.00	3,870.00	200.00	.....	58,700.00	350.00	2,300.00
Total, ...	$18,572,947.50	$510,580.20	$58,829.00	$1,450.00	$5,221.00	$857,214.00	$13,308.00	$5,148.00

GRAND TOTAL—$20,024,697.70.

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FACTORIES IN STATE.

District.	*Number.*
"A,"	284
"B,"	387
"C,"	485
"D,"	590
"E,"	240
"F,"	449
"G,"	676
"H,"	707
"I,"	565
"J,"	554
"K,"	207
"L,"	359
SPEC. "J—L,"	354
SPEC. "L,"	359
SPEC. "J,"	404
"M."	530
Total Factories	7,109

EXPLOSIVE WORK.

Certificates of Compliance Issued,	159
Fees collected,	$2,957 00

EXPLOSIVES STORED.

T. N. T.,		1,025,000 lbs.
High Explosives,	3,201,800 lbs.	
Dynamite,	1,179,476 lbs.	
60 per cent. Dynamite,	5,800 lbs.	
50 per cent. Dynamite.	2,000 lbs.	
40 per cent. Dynamite,	3,200 lbs.	
Dynamite & Gelatine,	975,000 lbs.	
Dynamite & Blasting Powder,	5,700 lbs.	
Low Grade "Straight" N. G. Dynamite,	10,300 lbs.	
Total,		5,383,276 lbs.
Double Base Smokeless Powder.	1,789,600 lbs.	
Smokeless & Black Powder,	454,845 lbs.	
Ammonia Powder,	2,500 lbs.	
Gelatine & Blasting Powder.	20,000 lbs.	
Powder Total,		2,266,945 lbs.
Wet Picric Acid (10 per cent. Wet content),	3,000,000 lbs.	
Wet Nitrovens,	100,000 lbs.	
Nitro Starch.	8,000 lbs.	

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Dry Tetryl.	75,000 lbs.	
Composition.	150 lbs.	
Ammonia.	500 lbs.	
Gelatine & Ammonia.	41,000 lbs.	
Sulphur, Potash & Antimony,	325 lbs.	
Filminate of Silver & Mercury,	50 lbs.	
Miscellaneous Total.		3,225,025 lbs.
Shells,		450 lbs.
Grand Total.		11,900.696 lbs.
Electric Blasting Caps.		5,500,000
Blasting Caps.		33,463,600
		38,963,600
Torpedoes.		1215 gross

CONCERNS WHO HAVE MADE APPLICATION FOR LICENSES.

Manufacturers of powder.	17
Mines.	5
Quarries.	38
Fireworks Companies.	15
Construction Companies.	5
Chemical Companies.	2
Storage Companies.	1
Total,	83
Individual Magazines.	179
Discontinued Magazines.	63
Discontinued Plants.	6
Discontinued Quarries.	2
Discontinued Chemical Companies.	1
Total,	72

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REPORT OF THE BUREAU OF ELECTRICAL AND MECHANICAL EQUIPMENT.

ROWLAND H. LEVERIDGE, CHIEF OF BUREAU.

The report of the Bureau of Electrical and Mechanical Equipment for the period beginning July 1, 1919, and ending June 30, 1920, is as follows:

General Inspections.	4,353
Orders issued calling for fire alarm systems or repairs to existing systems,	147
Completed fire alarm systems accepted as complying with fire protection law.	29
Completed engine stop systems.	5
Total number of orders issued,	1,673
Total number of orders complied.	1,254
Total number of orders cancelled.	740
Total number of machinery safeguarding items recommended.	3,477
Orders issued for inauguration of factory fire drills	283
Orders issued for organization of factory fire brigades	29
Surveys made, including drawings.	102
Plans examined and approved.	105
Specifications checked and acted upon.	125
New mechanical or electrical devices examined and approved.	35
Mechanical and electrical devices re-examined and continued on record as approved material.	83
Letters Received.	4,738
Letters Written.	4,523

In approaching the problems confronting the Department of Labor in the industrial field, experience has shown clearly the necessity of good salesmanship on the part of the State's representatives charged with overcoming the human wastage in industry. By "good salesmanship" is meant the selling of the idea of safe practice, not alone to those directly responsible to labor, the employer, but to the individual worker, for by this means only may industrial accidents be reduced to a minimum. The installation of all manner of safeguards as preventives to the loss of life or limb represents but a small portion of the responsibility of the Department of Labor or any supervising authority,

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as it must be remembered that the American nation as a whole has been referred to by the best writers on the subject as an "unsafe" nation, by which is meant that collectively and individually we are prone to take a chance. This is seen every day in our industrial operations as well as on the street, and the mere providing of a safeguard as an enclosure around a dangerously exposed moving machine part merely expresses the mechanical means of protecting the worker. This safeguard may take the form of metal barriers completely housing the dangerous part, or it may take the form of specialized appliances intended to automatically prevent the operation of the machine by the introduction of foreign matter between the working planes, such as in all punch press processes. In the case of the guards forming barriers fully enclosing the exposed parts, it is not difficult to convince the individual worker of the desirability of such practices, but in the case of special processes involving perhaps slight additional effort on the part of the worker to "play safe," the tendency to take the chance is evidenced by the numerous accidents occurring on such machines, the investigations proving in the majority of cases that the safety devices had been made ineffective by the worker because of imagined disadvantages. The true purpose of the safety device is lost sight of in the willingness of the worker to be satisfied with conditions as he has previously known them and his unwillingness in the majority of cases to forsake long-established practices for the new and safe method of operating the machine or device, although this may not involve as great a number of movements on his or her part with the safety appliances in service as were necessary without it. It therefore becomes evident that the thought of "Safety First," that is, safe operation on the part of each individual, must hold a position in the mind of the worker equal to that of production, and until this thought is carried to all branches of industry in a thoroughly practical and reasonable manner, the supervising body, in this case the Department of Labor, has not fulfilled its responsibility to industry.

Following this thought the Department of Labor is preparing for delivery a series of illustrated lectures and round table dis-

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cussions intended to reach all industry. This educational work will be carried to every section of the State, and in the case of the Electrical and Mechanical Bureau the subject of safe practices in machine operation in all its branches will be dealt with in detail. Illustrations of the salient points in connection with the hazards involved in each branch of industry will be dealt with specifically in order that the worker as well as the management of our industries may become familiar with the statistical records of preventable accidents, as well as familiarize themselves with the sources of these all-too-frequent occurrences. Also will be illustrated the most practical method of reducing the accident ratio and frequency by mechanical means supplemented by local safety organizations co-operating with the Department of Labor and under its direction in this educational campaign.

Intimately associated with accident frequency and ratio is the problem of factory lighting. It has been proven beyond question that poor lighting in industry bears a very definite relation to industrial accidents, aside entirely from the advantages which will accrue from a good lighting installation. Sharp contrast of light and shadows is a very prolific source of industrial accident, as one may well understand by an example which is familiar to us all, that of standing at an open window, looking at the bright sky for a moment or two, and then trying to traverse a poorly-lighted room, with the result that objects lying in the path of travel present serious tripping hazards. The same applies to work space aisles, passageways and stairways. Glare from improperly shaded lamps, especially those of the modern type of high intensity, produce this very result, and in addition cause a rapid deterioration of the worker's efficiency through an impairment of eyesight. This and allied subjects, such as increased production, lowered cost of maintaining an industrial plant through reduction in accident ratio and frequency, reduction in spoilage through the worker being able to properly see his work, and the better morale resulting from well-lighted, cheerful surroundings will also be dealt with in this educational campaign.

It is with a deep sense of responsibility that this work is approached by the Chief of Bureau having supervision over the lines just enumerated, particularly in view of the fact that it de-

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volves upon him to prepare for application the codes, rules and formulas for use in industry to alleviate the suffering in the ranks of the industrial workers and to confine to the smallest possible limits the accidents, approximately 80 per cent. of which are preventable, within the borders of our State.

In the establishment of the Industrial Museum of Safety at Jersey City, the Department of Labor is creating a clearing house through which industry may secure all available information pertaining to safe practices. Physical examples in operation will be on display and in such a manner that a thorough understanding of the work and purpose of this Department will be had at small effort. A physical demonstration is far more convincing to the industrial management and worker than the mere placing of a printed code in his hands, and this industrial museum, coupled with the educational program outlined, will unquestionably result in a revolutionary trend downward in the accident ratio instead of constantly mounting in spite of the efforts throughout the country to deal with this economic waste.

The work of the Bureau of Electrical and Mechanical Equipment for the past year illustrates in some measure the vast responsibility resting with the Department of Labor in its relation to industry, and it is with pleasure that the foregoing summarized report of work accomplished is submitted. This report does not deal in any sense with the herculean efforts involved in the establishment of the Industrial Museum of Safety to which reference has been made, as this work represents additional responsibility not in the ordinary line of duty, but a word on this subject may not be amiss at this time. All of the machinery exhibits, representing a value of approximately $200,000; the installation of lighting exhibits, representing a value of approximately $20,000, and the installation of fire alarm and safe electrical equipment representing a value of approximately $10,000, is under the supervision of the Chief of Bureau, including all of the engineering work involved, together with the actual supervision of installation. The duties of the Bureau follow:

Preparation of Codes on machine protection, engine stop equipment, fire alarm equipment, factory lighting, and engineering data relating to these lines of work.

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Supervision of all equipment installed in the industries coming under these heads and the technical instruction of the field inspection force on these subjects.

Examination of plans and specifications submitted for approval on each piece of work required in industry.

Personal investigation of special hazards in the field and the preparation of corrective measures to prevent the reoccurrence of serious accidents.

Supervision of the work of the field inspection force insofar as the subjects first mentioned are concerned, and the complete supervision of Bureau detail which includes all technical and general correspondence and the maintenance of office records.

Examination with rejection or approval of all safety equipment coming under the heads above enumerated and the maintenance of official records of such action.

It is with a feeling of optimism and assurance that the Bureau enters upon another year of its activity in the field, well knowing that the established policies as above roughly outlined will result in a very decided improvement in industrial conditions.

BUREAU OF HYGIENE AND SANITATION, BAKERIES AND MINES.

JOHN ROACH, CHIEF OF BUREAU.

During the past year the Bureau of Hygiene and Sanitation has received earnest co-operation from the manufacturing interests in this State in the official task of safeguarding workers from the effects of impure air, noxious fumes, harmful gases, industrial dusts, trade poisons and processes dangerous to life and limb.

It is exceedingly gratifying to report this very satisfactory relationship which exists between the manufacturing interests of our State and the Department of Labor, for we are confident that industrial processing can only be made safe by and through the co-operation of the State and manufacturing interests and the working people who are employed in our varied industries. A well-defined duty rests on all of us, and the best results in this respect are obtained when intelligent safety rules of industrial conduct, based on experience and endorsed by industrial engi-

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neers, are promulgated by the State and these rules are enforced by the joint co-operative action of employer and employes.

Our rules on sanitation and hygiene have received the endorsement of industrial engineering, and during the past year large numbers of effective installations of equipment have been made in the industrial plants throughout our State.

DUST REMOVAL.

Dust removal installations have been placed on practically all kinds of dust-generating machines, including wood-working, textile, shoe, leather, clay, chemical, and buffing and polishing machines.

We are convinced that so far as polishing and buffing installations are concerned we have about reached the maximum of efficiency in dust removal equipment. Some years ago the very serious conditions that menaced the health of workmen employed on buffing and polishing wheels was drawn to the attention of the Department of Labor and a vigorous campaign was commenced, the successful termination of which has covered practically every buffing and polishing wheel in the State with an efficient type of dust-removal equipment.

During the year a great many wood-working dust-removal installations have been made along standard lines. It is worth noting that this is the only State in the Union that has standardized dust-removal equipment for wood-working machines. A contractor may now receive definite instructions on the technical details involved in constructing dust-removal equipment on wood-working machines by applying to this Bureau.

Notable installations have been made on dust-generating machines in textile plants in Paterson. The entire work comprehended in our original orders has not been finished in these plants, but substantial progress may be reported thereon.

Attention is now being given to the compilation of industrial rules for the installation of dust-removal equipment on rubber mill machinery in accordance with a co-operative study made by the Chief of the Bureau of Hygiene and Sanitation with the State Board of Health of Ohio during the month of November,

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1919. A large number of rubber mills in the State of Ohio were visited, and an interesting study was made of the efficiency of dust-removal equipment installed on rubber mills that were handling poisonous accelerators.

During the year Mr. F. S. Crum, Assistant Statistician of the Prudential Insurance Company of America, compiled mortality statistics for the New Jersey Tuberculosis League, and his figures seem to show the greatest improvement in the mortality from tuberculosis was to be found in workers employed in the hatting industry and the group of industries included among metal grinding. The figures, as given below, are extremely interesting and would seem to show that the vigorous campaign waged by the Department of Labor to improve working conditions in these industries is bearing good fruit.

PROPORTIONATE MORTALITY IN SPECIFIED INDUSTRIES FROM TUBERCULOSIS OF THE LUNGS, NEW JERSEY 1909-1918.

HATTERS.

	1909-1913 Deaths from			1914-1918 Deaths from			
Ages	(A) All Causes	(B) Tuberculosis of the Lungs	Percentage (B) of (A)	(A) All Causes	(B) Tuberculosis of the Lungs	Percentage (B) of (A)	Percent Increase or Decrease
10-19, ...	3	2	66.7	27	8	29.6	— 55.6
20-29, ...	44	28	63.6	65	22	33.8	— 46.9
30-30, ...	69	49	71.0	74	23	31.1	— 56.2
40-49, ...	117	42	35.9	84	27	32.1	— 10.6
50-59, ...	102	16	15.7	88	28	31.8	+ 102.5
60 and over,	150	7	4.7	134	3	2.2	— 53.2
Total, ages 10 and over,	485	144	29.7	472	111	23.5	— 20.9

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METAL GRINDERS.

Ages	1909-1913 Deaths from (A) All Causes	(B) Tuberculosis of the Lungs	Percentage (B) of (A)	1914-1918 Deaths from (A) All Causes	(B) Tuberculosis of the Lungs	Percentage (B) of (A)	Percent Increase or Decrease
10-19, ...	4	—	——	4	—	——	——
20-29, ...	23	14	60.9	39	14	35.9	—41.1
30-39, ...	39	19	48.7	66	29	43.9	— 9.9
40-49, ...	44	19	43.2	53	17	32.1	—25.7
50-59, ...	21	5	23.8	55	13	23.6	— 0.8
60 and over,	22	3	13.6	44	3	6.8	—50.0
Total, ages 10 and over, ..	153	60	39.2	261	76	29.1	—25.8

NOTE:—The above figures were prepared by Mr. F. S. Crum, Assistant Statistician of The Prudential Insurance Company of America, as Chairman of the Committee on Health in Industry of the New Jersey Tuberculosis League.

GENERAL VENTILATION.

Our general standards of ventilation have been accepted with practical unanimity by the incandescent lamp manufacturing corporations in our State. These standards of ventilation were worked out by one of the large plants in the State and they form the basis of engineering computation for the installation of ventilation equipment in the smaller plants. While the standards have not been worked out with the same complete definiteness of detail that marks our rules on dust-removal systems, still the standardization of equipment is complete enough to enable any contractor to install a satisfactory system of ventilation after having been advised by this Bureau. The general basis of ventilation of this character requires an air change in the workroom of about once every ten minutes.

Air-conditioning apparatus has been installed in a number of dye houses in our State that were hitherto regarded as a nuisance and in a measure a menace to industrial health. Very serious steam conditions existed in dye houses prior to the installation of standard ventilation equipment, and in addition severe

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losses were experienced by manufacturers due to the steam condensing and dripping from roof and side walls. Our standards of ventilation now require that apparatus shall be installed in these establishments that will change the air in the workroom approximately once in every four minutes. The air is discharged into the workroom at a temperature of about seventy-five degrees. This warm air dries up the moisture and is pressed out through a monitor in the roof. One of our neighboring States investigated this method of ventilating dye houses last winter, and I understand that they are now advising the installation of similar equipment.

The installation of ventilation equipment in laundries has proceeded with great rapidity, so that nearly all the commercial laundries in our State have been equipped with ventilating apparatus in accordance with our standard rules.

Practically all of the printing establishments in the State of New Jersey where linotype machines are used have installed our standard ventilation equipment. The few remaining plants that have not yet made installations have agreed with the Department of Labor to install the equipment at an early date.

Our standard method for the removal of poisonous gases from linotype machines has received attention in the bulletin of the United States Bureau of Labor Statistics (Industrial Accidents and Hygiene, Series No. 12). Our Bureau furnished photographs and charts for an article called "Hygiene of the Printing Trades," written by Alice Hamilton, M.A., M.D., and printed in Industrial Accidents and Hygiene, Series No. 12.

TOILET, WASHING AND DRESSING EQUIPMENT.

The work of installing sanitary equipment and welfare betterments has made satisfactory progress. Our Sanitary Industrial Standards form the engineering basis for these installations, and I understand from the inspection reports that much of the old type toilet and washing equipment that was formerly used in our industries has been replaced by standardized modern equipment.

Most of the large plants in our State have gone over their property, removed all the old washing and toilet equipment and

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replaced it with the more modern kind located in light, well ventilated, roomy enclosures.

Most of the foundries in our State have installed lavatory equipment of a satisfactory kind, including showers. A number of the very large plants have gone into this work on an extensive basis and established lunch room equipment in addition to toilet, washing and dressing equipment.

The advice of this Bureau has been sought in many cases and advice has been given in accordance with the policy expressed in the report of the Bureau for the fiscal year 1917.

OCCUPATIONAL DISEASE REPORTING.

During the year the following cases of occupational diseases were reported to this Bureau:

Lead Poisoning,	54 cases
Mecury Poisoning,	1 case
Anthrax Poisoning,	5 cases
Nitro & Amido Poisoning,	23 cases

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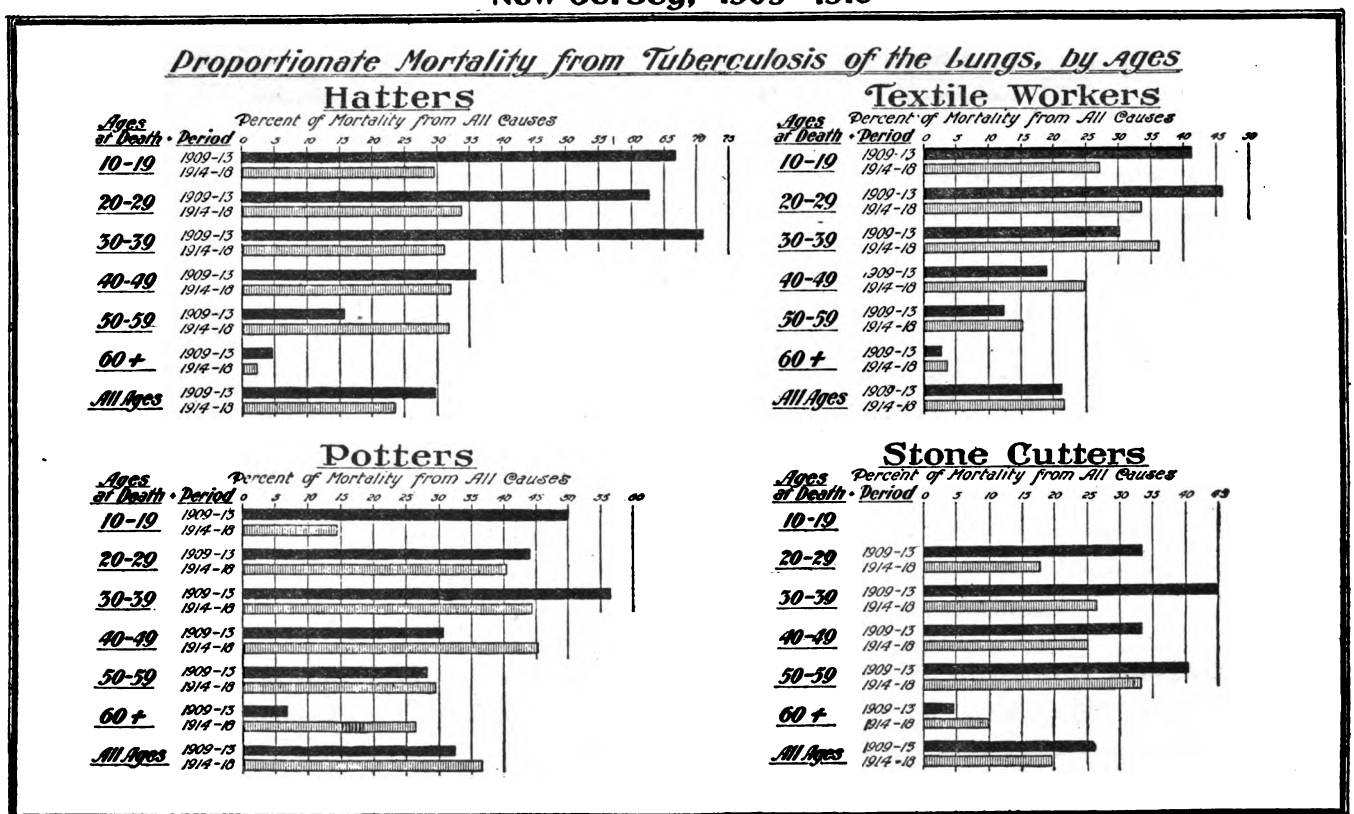
Mortality from Tuberculosis in Certain Occupations
New Jersey, 1909–1918



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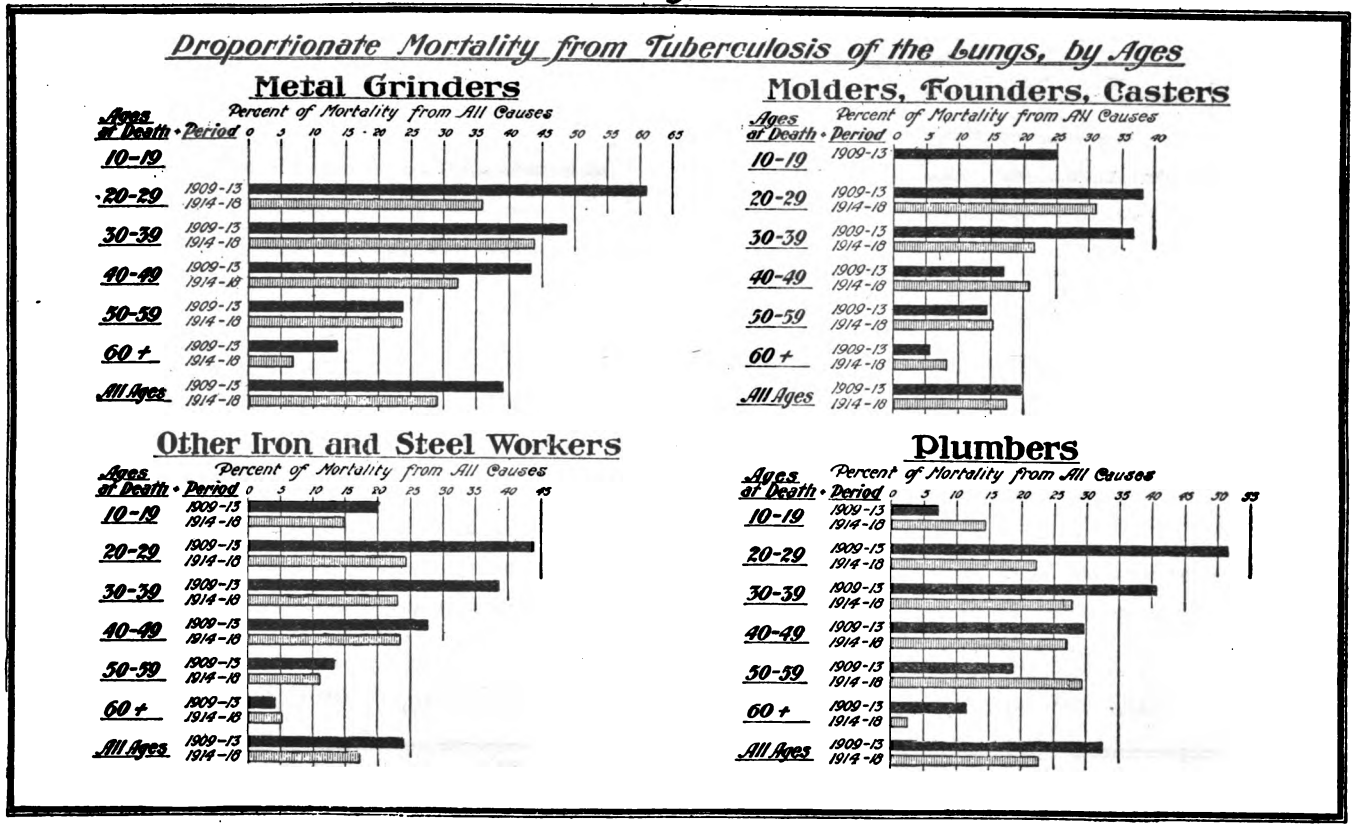
Mortality from Tuberculosis in Certain Occupations
New Jersey, 1909–1918


Proportionate Mortality from Tuberculosis of the Lungs, by Ages
Metal Grinders
Percent of Mortality from All Causes
Ages at Death
Period
0 5 10 15 20 25 30 35 40 45 50 55 60 65
10-19
20-29
30-39
40-49
50-59
60 +
All Ages
1909-13
1914-18
Molders, Founders, Casters
Percent of Mortality from All Causes
0 5 10 15 20 25 30 35 40
Other Iron and Steel Workers
Percent of Mortality from All Causes
0 5 10 15 20 25 30 35 40 45
Plumbers
Percent of Mortality from All Causes
0 5 10 15 20 25 30 35 40 45 50 55

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The Legislature of 1920 repealed Chapter 351, Laws 1912, which required physicians to report persons whom they believed to be suffering from poisoning from lead, phosphorus, arsenic or mercury, or from anthrax or compressed-air illness.

The State Department of Health is now engaged in securing data on the whole subject matter of occupational disease reporting. It is the intention of the State Department of Health to require physicians to report all cases of occupational diseases to the health officers in the locality in which the physicians practice. The health officer will then report the case to the State Department of Health and the State Department of Health will report the matter to the State Department of Labor. It is thought that this method of reporting will be more successful than the old method of reporting directly to the State Department of Health. I believe it is the intention of the State Department of Health to furnish specific medical data to local physicians in order that they may become acquainted with the symptoms that accompany a great variety of occupational diseases.

After occupational diseases are reported to the Bureau of Hygiene and Sanitation the Bureau should follow up the case by visiting the patient's home, hospital or other place where he is living and ascertain whether the case is a case of occupational poisoning. In many cases physicians who are not familiar with the symptoms of occupational diseases report poisonings from compounds that are not used in a specific industry.

Accuracy in reporting occupational diseases is of the greatest value, for the health condition of operatives in and around industrial processes is the best index of the value and the efficiency of the preventative methods advocated by the Department of Labor.

In places where industrial plants are operated carelessly and where frequent poisonings indicate careless and lax practices, the Bureau of Hygiene and Sanitation should have a competent physician available who should be placed in the plant to investigate health conditions and make such recommendations as the circumstances would seem to warrant. An expert physician of this character might be employed directly by the Department of Labor or he might be employed directly by the Department of

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Health, and the work of investigating trade conditions could then be conducted on a co-operative basis.

HEARINGS ON UNCOMPLIED ORDERS.

During the past year a system of holding hearings on uncomplied orders has been inaugurated on a large scale by this Bureau. Among the many problems of an administrative character that confront the Chief of the Bureau of Hygiene and Sanitation is that of securing prompt compliance with factory orders that are issued on the recommendation of the factory inspectors and which sometimes involve the changing of factory processes, the alteration of established factory customs or the installation of expensive factory equipment that the inspector deems necessary for the protection of life, limb or health of the workers employed.

We decided to issue a summons on factory owners and employers generally, who failed to comply with orders, to appear before the Chief of the Bureau at either Camden, Trenton, New Brunswick, Perth Amboy, Elizabeth, Newark, Jersey City, Passaic or Paterson to show cause why departmental orders had not been complied with. We thought it would be better to proceed in this manner rather than to turn the uncomplied order over to the Attorney General for prosecution, as is required by the factory laws.

During the past year we summoned approximately 400 persons against whom the Department had issued orders on hygiene and sanitation to appear before the Chief of the Bureau and show cause why the orders had not been complied with, and we found in nearly every case that the employers were very willing to cooperate with us in our work as soon as we explained to them the purport and extent of the official order which they had neglected to give attention. The results accomplished by this method were most gratifying, for at the conference the district inspector and the employer met and adjustment of the order was in all cases easily reached.

A stenographer takes a record of the proceedings, and a letter is written in the presence of the employer, setting forth the nature of the understanding he has had with the Chief of the Bu-

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reau. A time limit is set within which it is agreed the order will be complied with, and I wish to say that the agreements entered into have been kept in a most satisfactory manner. This kind of procedure establishes a more satisfactory relationship with the employers than the old practice of issuing an order and then advising them that in the event of their not complying with the order the matter will be turned over to the Attorney General for prosecution. This method of dealing with uncomplied orders is expressive of the changed attitude of the whole public towards the enforcement of industrial rules. Formerly Departments of Labor were looked upon as a good deal of a nuisance, and factory inspectors were ushered through industrial plants and given as little attention as the character of the man and the dignity of the office would permit.

In the old days industrial rules were made by State legislators who in the main were not familiar with industry, and the rules were not expressive of the best thought on industrial health and safety. The conservation of human life, limb and health has recently become of such importance that earnest efforts are now being made by industrial managements and State and Federal authorities to minimize the annual physical toll that at present imposes a heavy burden on productive industry.

Experience indicates that this can be best accomplished through the means of industrial co-operation between the employer and the employe supplemented by intelligent State regulations. Rules of industrial conduct that are promulgated by the State can accomplish this result only when predicated on practical operating methods and in addition, to be most successful, they should bear the sanction of technical engineering experience.

Industrial rules that are reasonable and well founded are not difficult to enforce, especially if the industrial workers in the locality are educated in the "Safety First" movement. The rules usually express the best engineering experience that is to be found in the industry in which they are operative. As a result of this modern policy Labor Departments now seldom resort to law suits to enforce industrial rules. The police power that is vested in Labor Departments is an unused weapon and they

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have become Bureaus of Research and Information that bring together the experts in industry to establish the rules, and the Labor Departments interpret these rules and see that they are enforced.

SAFETY MOVEMENT.

During the past year the Department of Labor has devoted considerable energy to the work of organizing industries in the several parts of the State into safety locals. The intention of the Department in organizing these safety locals is to promote safety education among plant managers, foremen and workers employed in the industries. Meetings have been held in Camden, Newark and Jersey City, and executive committees have been selected to prepare an educational program consisting of moving pictures and lectures for the season beginning with October, 1920.

The Chief of the Bureau of Hygiene and Sanitation has been placed in charge of this work and substantial progress has been made to enlist our industries in this progressive movement. The safety movement in its best sense applies to safety from dangerous machinery, improper practices, structural defects and processes as well as from poisonous substances, industrial dusts and noxious gases. It comprehends the establishment of co-operative action between the employer and the employe, for the most satisfactory industrial rules are ineffective unless the employees in a plant work safely and refrain from heedlessly exposing themselves to physical dangers that flow from improper practices and from handling dangerous trade poisons carelessly. In one of our large industrial plants employing some 3,000 men accidents were reduced 98 per cent. through the organization of safety committees and the establishment of safe practises.

The value of this work is not limited to the prevention of physical accidents resulting from violence. The installation and use of proper sanitary equipment, the control of dangerous dusts, gases and fumes, the proper treatment of minor wounds that prevents infection in all work that may be comprehended under the general cognomen of Safety work.

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This movement deserves the unreserved co-operation of our fellow citizens for we are confident that a well organized safety movement in New Jersey's industries will materially reduce the annual toll of human wastage that at present seriously handicaps productive enterprises.

JOINT COMMITTEE ON SAFETY CODES.

On December 8, 1919, a conference was held at the Bureau of Standards in Washington, on industrial safety codes, at which there were representatives of all organizations of a national scope interested in any of these wide phases of industrial safety. The conference on December 8th grew from an earlier conference that was held on January 15, 1919.

There was a thorough discussion of the whole question of the advisability of establishing a program for the promulgation of safety standards that would cover the entire field of industry. The consensus of opinion was that there should be perhaps fifty or even one hundred standards developed during the next few years.

The question of industrial safety is a far-reaching one, for it not only involves vast financial and industrial interests but it may be said to involve the welfare of more than 6,000,000 workers and indirectly the welfare of our people as a whole.

The conference unanimously voted that the preparation of all such safety codes as might be adopted should be under the auspices and rules of procedure of the American Engineering Standards Committee. In accordance with the recommendations of the conference the American Engineering Standards Committee requested the International Association of Industrial Accident Boards and Commissions, the Bureau of Standards and the National Safety Council to organize a joint committee on safety codes, this committee to include representatives of the above organizations and such other persons as they might advise. It was agreed that this joint committee should have the responsibility of selecting organizations interested in industrial safety to act as sponsors for the preparation of the industrial codes that might be developed and that this joint committee be required to make a progress report by February 1, 1920.

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The personnel of the Joint Committee on Safety Codes is as follows:

D. S. Beyer, 185 Devonshire St., Boston, Mass.—Liberty Mutual Insurance Company; Director, National Safety Council.

Edward F. Boyle, Albany, N. Y.—Chairman, New York Industrial Commission.

C. B. Connelley, Harrisburg, Pa.—Commissioner, Pennsylvania Department of Labor and Industry.

L. A. de Blois, DuPont Building, Wilmington, Del.—Fifth Vice-President, National Safety Council; Chairman of the Councils Committee on Standardization and Technical Development.

W. C. L. Eglin, 1000 Chestnut St., Philadelphia, Pa.—Chairman, Committee on Safety, Rules and Accident Prevention, National Electric Light Association.

George P. Hambrecht, Madison, Wisconsin—Chairman, Industrial Commission of Wisconsin.

Royal Meeker, Washington, D. C.—Commissioner of Labor Statistics, Department of Labor; Secretary, International Association of International Accident Boards and Commissions.

Dana Pierce, 25 City Hall Place, New York, N. Y.—Underwriters' Laboratories, New York, N. Y.

M. G. Lloyd, Washington, D. C.—Chief of Safety Section, Bureau of Standards.

C. C. Rausch, 14 W. 24th St., New York, N. Y.—Assistant Director, Safety Institute of America.

Calvin W. Wright, 29 W. 39th St., New York, N. Y.—Secretary, American Society of Mechanical Engineers; Honorary Secretary, American Society of Safety Engineers.

John Roach, Trenton, N. J.—Chief, Bureau of Hygiene and Sanitation, New Jersey Department of Labor; Chairman of Committee on Safety Rules, International Association of Industrial Accidents Boards and Commissions.

E. B. Rosa, Washington, D. C.—Chief Physicist, Bureau of Standards.

A. W. Whitney, 13 Park Row, New York, N. Y.—Manager, National Workmen's Compensation Service Bureau; Director, National Safety Council.

S. J. Williams, 168 North Michigan Ave., Chicago, Ill.—Secretary and Chief Engineer, National Safety Council.

During the year this committee has held a number of meetings and they have selected sponsors for the preparation of safety codes on the following subjects:

1. Abrasive Wheels.
2. Blast Furnaces and Steel Works.
3. Blooming and Rolling Mills.
4. Boilers, Locomotive.

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5. Boiler Room Equipment and Operation.
6. Boilers, Stationary Steam.
7. Construction Work.
8. Conveyors and Conveying Machinery.
9. Cranes, Derricks and Hoists.
10. Electrical Fire Code.
11. Electrical Safety Code.
12. Electrical Fire and Safety Code.
13. Electricity in Bituminous Coal Mines.
14. Elevators and Escalators.
15. Engines, Internal Combustion.
16. Engine Room Equipment and Operation.
17. Engines and Turbines, Steam.
18. Explosives.
19. Floor Openings, Railings and Toe Boards.
20. Foundries.
21. Gas Safety Code.
22. Head and Eye Protection.
23. Ladders.
24. Lighting Code.
25. Lightning Protection.
26. Logging and Sawmill Machinery.
27. Machine Tools.
28. Mechanical Transmission of Power.
29. Paper and Pulp Mills.
30. Power Control, Industrial.
31. Power Presses.
32. Pressure Vessels, Non-fired.
33. Refrigeration, Mechanical.
34. Sanitation Code, Industrial.
35. Stairways, Fire Escapes and Other Exits.
36. Tanneries.
37. Woodworking Machinery.

The work of preparing these codes may take several years but when it has been finally completed the codes will undoubtedly represent the best engineering thought existent in industry and should have an important influence in the improvement of working conditions.

The work of attending these meetings and giving attention to the details involved which means research, investigation and study takes a great deal of time, but the Chief of the Bureau feels that it is a worthy work and should be performed in a conscientious manner.

During the year the Chief of the Bureau has attended the fol-

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lowing conventions and delivered lectures and addresses before the following organizations:

October 4th, 1919—Attended conference in Washington, D. C., to discuss the agenda of the International Labor Conference.

November 11th, 1919—Made a joint trade study of the rubber industry in Ohio in company with Dr. E. B. Starr, Chief, Division Industrial Hygiene of the Ohio State Board of Health.

November 15th, 1919—Attended the American Mining Congress, St. Louis.

January 8th, 1920—Attended meeting of the National Safety Code Committee.

February, 1920—Attended meeting of the National Safety Code Committee.

March, 1920—Delivered an address at Rutgers Agricultural College on "Women in Industry."

March, 1920—Delivered an address before the City of New York Department of Health on the subject of "Industrial Sanitation."

April, 1920—Addressed the New Jersey Health Officers' Association on the question of Co-operative Action Between the Department of Labor and the Local Health Officials.

May, 1920—Delivered and address before the Safety Committee, Superintendents and Foremen of Johnson & Johnson, New Brunswick, on the question of Fire Protection. Delivered an address before a meeting of representatives of the industries of Camden on the question of Industrial Safety.

May, 1920—Delivered an address in Jersey City before a meeting of representatives of Jersey City industries on the question of Industrial Safety. Addressed a meeting of industrial nurses in Newark.

June, 1920—Delivered an address before representatives of the industries of Newark on the question of Industrial Safety. Delivered an address at the plant of the Ingersoll-Rand Company, Phillipsburg, on the question of Industrial Safety. Delivered an address before the State Conference on Child Hygiene, New Jersey State Department of Health, Asbury Park, on the question of Women in Industry. Addressed the Essex County Master Bakers' Conference in Newark.

BUREAU OF MINES.

At the beginning of the present fiscal year the work of supervising the inspection and safe operation of mines and quarries was turned over to the Bureau of Hygiene and Sanitation.

Immediately upon being invested with this additional responsibility the Bureau had 1500 copies of Chapter 187, Laws 1919, creating a Bureau of Mines in the Department of Labor and Defining the powers and duties of the Bureau, printed for distribution. Previous to this time the Department of Labor had no legislative authority to enforce safety rules or practices in mining operations.

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I am giving below statistics for the fiscal years beginning 1910 and ending June 30, 1920, which show the tragic history of mining operations in our State unregulated by State supervision.

MINERS, TUNNELMEN, EXCAVATORS, ETC.

Year.	*Fatal.*	*Non-fatal.*	*Total.*
1910,	64	106	170
1911,	33	56	89
1912,	26	37	63
1913,	18	74	92
1914,	24	95	119
1915,	22	49	71
1916,	13	72	85
1917,	20	72	90
1918,	11	178	189
1919,	17	205	222
1920,	1	83	84

It will be noticed from an examination of the above statistics that mining operations are now conducted in a much safer manner than formerly.

During the present year not a single operative employed in or about a mine lost his life during the course of his employment. A fatal accident occurred at the plant of the New Jersey Zinc Company on August 21, 1919, when a workman who was employed by this Company as a millwright foreman walked on the railroad siding on the inside of the plant and was struck by a car operated by the Lehigh and Hudson Railway Company. This was not a mine accident and could not have been prevented by any foresight on the part of either the State Factory Inspector or the Safety Committees employed by the New Jersey Zinc Company. This accident, therefore, is not chargeable to mining operations.

This is quite a contrast to the year ending June 30, 1919, when seventeen (17) miners lost their lives during the course of their employment. Such a decided change in working conditions is not the result of chance and it must be attributed to the safer operation of the mines.

On assuming the responsibility for mine inspections the Chief of the Bureau visited each mine in the State, conferred with the mine operators and ascertained from them if the mining laws were satisfactory and if its provisions were workable.

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We are pleased to say that the mine operators in this State without exception guaranteed their hearty support in the work of making mine operations safer. Safety Committees were organized in each mine in the State where such committees had not been previously organized. These committees were impressed with the responsibility that rested on them and were advised that they constituted a tribunal before which any mine operative might appear with a complaint or a criticism, and that the complaint or criticism should receive courteous attention without regard to whether or not it was well founded.

Safety committees were requested to meet at least once in the month, to keep a record of their meetings and the transaction of such business as came before the Committees. The Chief of the Bureau of Hygiene and Sanitation attended many of these meetings of the Safety Committees, addressing them on the subject of safety and trying to impress on them the responsibility of the work in which they were engaged. The excellent character of the personnel of the committees and the value of the work performed by them is fittingly expressed in the total elimination of fatal accidents in mines of this State for the fiscal year ending June 30, 1920.

On behalf of the State Department of Labor I wish to express to the Safety Committees the deep appreciation we feel for the valuable services they have rendered to their fellowmen.

I am confident that hazardous industrial operations such as mining and quarrying can be safely carried on only when sincere and cordial co-operation exists between the State authorities, the operators, and the persons employed in and about our mines and quarries. A definite responsibility rests on the operators to provide safe equipment, safe premises, and expert supervision. The operators have a right to expect the workmen to co-operate with them and to refrain from indulging in hazardous practices, and to carefully note operating methods and to report defects therein that come under their observation.

The responsibility resting upon the Bureau of Mines consists in collecting available engineering data on safe operations and presenting this data to the mine operators and the safety commit-

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tees, and insuring the strict observance of all laws and practices relating to the whole subject of mine safety.

We desire to thank the mine operators for their cordial co-operation, without which the work of making mining operations safe would have proved futile. During the year the attention of the Bureau of Mines was directed to a report that the drinking water at the Richard Mine, and the Mount Hope mine was contaminated. The co-operation of the Department of Health was solicited and in consequence of this Dr. A. B. FitzRandolph, Assistant Director, Department of Health, State of New Jersey, assigned Mr. John E. Bacon, Chemist, to make an investigation. The following report on the subject matter was made by Mr. Bacon to the State Department of Health and a copy was directed to this office:

"INVESTIGATION OF DRINKING WATER SUPPLIES OF THE EMPIRE IRON AND STEEL COMPANY, MT. HOPE, N. J., AND THE THOMAS IRON COMPANY, WHARTON, N. J.

"JANUARY 7th, 8th, 1920. J. E. BACON.

"The type of ore mined and general conditions prevailing in the above mines are similar, and are as follows: The iron ore is magnetite (Fe_3O_4) and the veins have an incline of 18 to 20 degrees. Drifts and stopes at various points lead from the slopes, follow the ore veins, and the ore is blasted out. It falls by gravity to loading chambers and is loaded into cars from chutes. The ore is transported by means of small cars, electrically propelled, to the shaft where it is hoisted to the surface and thence goes to the crushers, after which the ore is separated from the gangue by magnetic treatment. The ore is then shipped to the companies' blast furnaces in Pennsylvania and melted into pig iron.

"The mine water seeps down the sidewalls and runs down various stopes, drifts and chutes by gravity to the lowest part of the level into a collecting chamber, from which it is pumped to the level above. This is repeated at the other levels until the water reaches the surface, when it is allowed to run to waste. It is a general practice to drink only foot wall water, that is, water that trickles down the side walls, and at various points a small triangular piece of metal is found driven into the rock, thus making water available for drinking."

"EMPIRE STEEL AND IRON COMPANY, MT. HOPE, N. J."

"This company employs about two hundred men underground. On the property is an up-to-date wash and change room, also a first aid station and a physician is available on short notice. The mine contains four levels; numbers three and four being used at the present time as ore has practically all

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been removed from the two upper levels. Number three is at a depth of 700 feet and slopes to 1500 feet. About twenty to thirty thousand tons of ore per month are mined. Empty powder containers placed at desired points are frequently used as depositories for fecal matter, but when not used, fecal matter is allowed to fall upon the ground rock and is treated with chloride of lime. No record of the number of cases of infected wounds during 1919 could be obtained, but the superintendent advised that there had been but few cases."

"THOMAS IRON COMPANY (RICHARD MINE), WHARTON, N. J."

"This company employs one hundred and eighty men, about one hundred underground, and mines about ten to twelve thousand tons of ore per month. Practically all the work is being done on number 7 level, South vein, at a depth of 724 feet, some developing work being done on the north vein of this level. An up-to-date wash and change room is being constructed on the premises and will be in operation in the course of a couple of months. Adequate toilet facilities are not provided. Those working on number 7 level defecate into the water collection chamber, the water in which is subsequently pumped to the surface. The superintendent's 'mine log' shows only two cases of infected wounds at the Richard Mine during 1919.

"Infected Wounds."

"Information obtained indicates that the small number of infected wounds follow the initial injury, and are undoubtedly the result of lack of attention in caring for the original wound. Large numbers of the miners have homes in the vicinity of the mines and usually care for a cow or a pig, and plant a small patch of ground. It is seen that an improperly bandaged wound upon the limbs might readily become infected from this source.

"Results of Bacteriological and Chemical Analyses.

"Attached is a tabulation of the results of the samples collected. Of the five samples collected at the Mt. Hope Mine, one only shows the presence of intestinal bacteria (B. Coli present five in five cc.), and this represents a composite sample of entire mine water, and would be expected to show evidences of contamination. Of the samples collected at the Richard Mine, two show the presence of the bacillus colon, and these also represent run of mine water from No. 9 and No. 7 levels, and would be expected to receive some contamination.

"As a result of this investigation, the waters used for drinking purpose in Mt. Hope and Richard Mines are considered as being potable and not likely to cause infection of wounds.

"Recommendations.

"The toilet facilities in both of these mines, particularly that of the Thomas Iron Company, are not deemed adequate. It is recommended that suitable removable tight containers, to fit in comfortable sitting contrivances, be installed in needed points in the near vicinity of the miners. This would obviate the occasional fouling of the passageways, which undoubtedly takes place under the existing conditions, and would permit the cans to be removed to the surface when full.

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TABULATION OF THE RESULTS OF ANALYSES OF SAMPLES OF MINE WATER COLLECTED AT MT. HOPE, N. J.
(Empire Steel and Iron Co.)

Number	Source	Nitrite	Alkalinity	20° C.	37° C.	B. Coli
W 2830	Taken from a running supply at Taylor Hoist, No. 3 Level — Source Diamond Drill Hole, ...	.007	23.0	560	3	abs. in 5 cc.
W 2831	Not used for drinking—No. 13 chute, No. 12 stope, No. 3 level, ...	.002	88.0	200	5	abs. in 5 cc.
W 2832	Taken from No. 19 chute, No. 11 stope, Drift 558, No. 3 level, ...	.007	83.0	5400	67	abs. in 5 cc.
W 2833	Taken at No. 8 chute, Leonard Incline No. 4 level,	.002	86.0	380	2	abs. in 5 cc.
W 2834	Composite sample of mine water not used for drinking purposes, ...	.010	93.0	...	1920	5 in 5 cc.

TABULATION OF THE RESULTS OF ANALYSES OF SAMPLES OF MINE WATER COLLECTED AT WHARTON, N. J.
(Thomas Iron Company)

Number	Source	Nitrite	Alkalinity	20° C.	37° C.	B. Coli
W 2835	Artesian well near Supt. office, ...	.002	....	18	0	abs. in 5 cc.
W 2836	Represents run of mine water and shaft water, No. 9 level, taken on No. 7 level, ...	.020	135.0	O.G.	2280	5 in 5 cc.
W 2837	Drinking water from foot wall, No. 7 level, No. 1 drift So. vein, ...	0	135.0	9	0	abs. in 5 cc.
W 2838	Run of mine water, No. vein, 7 level, not used for drinking, ...	0.10	300.0	O.G.	3900	1 in 5 cc.
W 2839	Shaft water, taken at No. 7 station, ...	.004	104.0	460	24	abs. in 5 cc.
W 2840	Taken outside of Allen Mine Tunnel. Used for drinking and domestic purposes, ...	.001	36.0	16	6	abs. in 5 cc.

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MINE STATISTICAL REPORT.

	ACCIDENTS.			MEN EMPLOYED.				ORDERS.	
	Fatal.	Compensable.	Minor.	Overground.	Underground.	Total.	Inspections.	Issued.	Complied.
Wharton Steel Co., Replogle Mine,	.....	5	.....	89	105	104	11	18	7
Empire Steel & Iron Co., Mount Hope,	.....	5	7	100	200	300	12	6	4
Empire Steel & Iron Co., Oxford,	.....	17	5	305	175	480	8	17	16
New Jersey Zinc Co., Franklin (see note),	1	27	.....	692	619	1311	14	15	10
New Jersey Zinc Co., Ogdensburg,	.....	.....	.....	124	122	246	6	2	.....
Thomas Iron Co., Richard Mine,	.....	10	.....	44	121	145	12	25	12
Ringwood Co., Peters Mine,	.....	4	.....	27	127	154	3	10	10
Ringwood Co., Cannon Mine,	.....	.....	.....	8	38	46	3	9	9
Dover Mines Corp., Dover,	.....	1	2	7	15	22	1	9	5
North Jersey Steel Co., Beach Glen,	.....	.....	.....	12	18	30	.....	.....	.....
Total,	1	69	14	1408	1540	2948	70	111	73

Note.—The fatal accident in the New Jersey Zinc Co. is the accident which is explained in the report on mines as occurring above ground and which was, in reality, a railway accident.

QUARRIES.

During the past year the inspection and supervision of safety and sanitation in quarries was placed in the care of the Bureau of Hygiene and Sanitation by the Commissioner of Labor. Inspections have been made of all the quarries in the State and orders have been issued requiring the quarries to operate safely and in accordance with safe practices and in addition to provide their employees with change houses for the storage of clothing, use of washing equipment, and housing of "First Aid Equipment."

Owing to the constantly changing conditions in operations, quarry work is difficult to inspect. During the past year the following fatal accidents occurred in quarries.

Accident	"Cause of Accident."
1	"Man was caught under falling rocks in quarry."
1	"Tug Maurice sank in storm."
1	"Drowned when tug Maurice, of which he was Engineer sank in storm."

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Accident	"Cause of Accident."
1	"From the position in which injured was found it was evident that he was knocked under the jackarm of the steam shovel, when the dipper stick or bucket was returned for loading; injured having stood in the way, and on the wrong side contrary to orders, as on this side operator cannot see when operating shovel."
1	"No witnesses to accident. The man subject to attacks of vertigo as reported by his Physician, Dr. Albright. Was found dead leaning against open stove with arms folded and head resting on arms with his clothing on fire. About ten minutes previous to his being found in this condition the raw department shut down which caused the cessation of taking of stone from scale which the man attended. His companion left to find cause of shut down. Upon returning found man in condition described above.
1	"Facing incline from floor of quarry injured man attempted to cross from left side of incline to right side and in so doing stepped over moving cable pulling loaded car up the left hand track while empty car was descending right hand track. In stepping over the moving cable he took a chance as same should have been a signal to him that another car was descending the incline. We are unable to explain his reason for crossing the tracks as his duties did not require him to be at that place."

NOTE:—The above causes of accident are given exactly as they were reported by the Companies in which the accidents occurred.

We printed a summary of the cause of the accidents as it appears that some of them could not be chargeable to quarry operations. Two men lost their lives when a tug sank off the Jersey Coast. Another workman was found dead leaning against an open stove, with his arms folded, and there is a question as to the cause of his death.

It is the intention of the Bureau to carry on a campaign of safety education in the quarries in an effort to minimize if not entirely eliminate serious and fatal accidents.

In conclusion of the report on mines and quarries I desire to express the deep appreciation of the Bureau of Mines and Quarries for the excellent work accomplished by our Mine Inspector who has been indefatigable in his duty, and who has succeeded in establishing safety conditions that not excelled by any mining community in our Country.

BAKERY AND CONFECTIONERY BUREAU.

During the past year the work of supervising the inspection of bakeries was assigned to the Bureau of Hygiene and Sanitation. Upon being assigned this new work this bureau proceeded

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to outline a comprehensive policy that included a block-system of bakery inspection, so that the inspector, in making his rounds, would not cover the same territory twice. Cards were printed and arranged in the files so that the assistant in the bureau could assign each bakery inspector a sufficient number of places to visit each day, so located one to another as to be most convenient to inspect. This block-system has worked out to very great advantage, for it enables the assignment of work in advance to the bakery inspector, and assures against duplication of effort.

New bakery inspection-forms were prepared that have reduced the clerical work that was formerly imposed on the inspector, and a new report blank has been given the inspection force that will expedite the clerical part of their employment.

A new policy of enforcement of bakery orders has been inaugurated, in accordance with which we summon the bakers, (against whom orders have been issued and who have not complied with same) to appear before the Chief of the Bakery Bureau, to show cause why their licenses should not be revoked for failure to comply with the bureau's rules. Excellent results have flowed from this policy of summoning bakery owners to appear to show cause. Formerly when orders were issued on bakery owners we were unable to follow them promptly because of the inability of our inspection force to cover the amount of territory involved. Under the new system a bakery owner has come to understand that he must promptly comply with our orders, and that our sanitary policy is merely an expression of the best sanitary engineering thought in connection with the manufacture and handling of foodstuffs.

The Chief of the Bureau addressed a meeting of the Essex County Master Bakers' Association and advised them that we were among the best friends they had, for we were aiming to establish such cleanly conditions in bakeries that the public would have confidence in their product. We urged the Master Bakers to co-operate with us, and we were assured by them that they would help us to the full extent of their ability. This gratifying expression of co-operation will enable us to secure a more prompt compliance with our official orders. In addition to this we solicited the co-operation of the Local Health Boards in Trenton,

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Asbury Park, Long Branch, Red Bank, South Amboy, Perth Amboy, Elizabeth, Newark, Jersey City, Paterson, Hackensack, Bloomfield, Passaic, Montclair, Maplewood, etc., to assist us in the establishment of better sanitary conditions in bakeries, confectioneries and ice cream establishments. The Local Health Boards agreed to work with us and in accordance with this understanding, joint inspections have been made in the above localities by our bakery inspectors and the representative of the Local Health Boards, and orders have been issued and copies of the orders mailed to the Local Health Boards, so that they could follow them up and see that the orders were promptly enforced. This follow-up work by the Local Health Officers has been of material assistance to us in establishing an improved sanitary condition in bakeries and ice cream establishments.

The Local Health Officers have done their work carefully and conscientiously and in fine spirit of co-operation, and the results of co-operative effort on the part of the State and the Local Health Authorities is indeed most gratifying. I feel in justice to the Local Health Boards we should make public acknowledgment of this, and thank them for the fine spirit they have displayed.

I think the work of maintaining sanitary conditions in bakeries, confectioneries and ice cream establishments is one in which both the Local Health Authorities and the State Department of Labor are jointly interested. The Local Health Authorities are deeply interested in this work because foodstuffs are usually consumed locally, and they are naturally interested in the health conditions prevailing in their own locality. In some cases Local Health Authorities by reason of lack of jurisdiction or lack of public spirit to back them up are unable to cope with unsanitary conditions. The State then, by reason of its great power and authority, can step in and insist on local food purveyors complying with sanitary rules that are manifestly fair and right.

When we summon bakers to appear before us to show cause why licenses should not be revoked, we usually call them before us in the offices of the Local Health Authorities. We find that this procedure is excellent, for it impresses the recalcitrant bak-

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ery owner that the Local Health Officer is backed up by the State and that he must comply with orders properly issued.

In the Bakery Bureau we have two male bakery inspectors who devote their entire time to the inspection of bakeries. In addition to this we have one woman employed who has a small district, and the factory inspection force inspect bakeries in outlying districts so as to minimize the cost of inspection service. It is readily seen, therefore, we must make use of the services of the Local Health Officers in this work.

We desire at this time to express our appreciation of the excellent work that has been performed by our bakery inspectors and the gratifying way in which they have assisted the Bureau in securing the co-operation of Local Health Officers.

A sanitary inspector's work is one of real importance and it requires a thorough fundamental knowledge of sanitary engineering, and in addition a knowledge of current industrial procedure that can be only gained by research and study.

The United States Department of Health has recently called attention to the spread of bubonic plague and advised that food products be carefully preserved from contamination through the medium of rats and other vermin. Our inspection force must take note of conditions such as these, and this Bureau is dependent upon their knowledge of sanitary conditions in granting licenses to bakers and confectioners.

During the past year there have been 559 original licenses issued to bakery and confectionery establishments, and 1,773 renewal licenses, which has resulted in the turning over to the State Treasurer of $2,332 in fees for these licenses.

The following will show a detailed report of the Bakery Bureau:

Approximate number of cellar bakeries in the State,	180
Approximate number of bakeries and confectioneries in the State	2,335
Total inspections made,	3,378
Total orders issued,	1,046
Total orders compiled,	1,104
Total orders cancelled,	95
Total items issued	3,057
Total items complied	2,019
Total items cancelled,	224

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INSPECTORS' ORDERS.

	Issued.	*Comp.*	*Canc.*
Seder Bakery District "A,"	487	358	21
Hayes Bakery District "B,"	165	305	31
Moore General Welfare District "A,"	113	115	24
Slayback General Welfare District "B,"	38	22	..
Sayer General Welfare District "C,"	1	1	..
Baird Regular District "A,"	23	23	..
Kuehnle Regular District "B,"	22	23	..
Tallon Regular District "C,"	158	213	13
Rearwin Regular District "D,"	4	3	2
Hotchkiss Regular District "F,"	10	28	4
Munson Regular District "J,"	7	2	..
Diviny Regular District "L,"	18	11	..
	1,046	1,104	95

INSPECTIONS.

Seder Bakery District "A,"	982
Hayes Bakery District "B."	1,174
Moore General Welfare District "A,"	298
Slayback General Welfare District "B,"	102
Sayer General Welfare District "C,"	1
Baird Regular District "A,"	221
Kuehnle Regular District "B,"	207
Tallon Regular District "C,"	355
Rearwin Regular District "D,"	11
Hotchkiss Regular District "F,"	11
Munson Regular District "J,"	8
Diviny Regular District "L,"	38
Total,	3,378

	Number		Increase	
	1919.	1920.	Amount	Per Cent.
Inspections made for year,	2,207	3,378	1,171	53.0
Orders issued for year,	610	1,046	436	71.4
Orders complied for year,	696	1,104	408	58.6
Items on orders,	1,294	3,057	1,763	136.2
Fees collected,	$1,852	$2,332	$580	25.9

It will be noted from the above tables that the work of the Bakery Bureau has increased during the year ending June 30, 1920, from 25.9 per cent. in the case of "fees collected" to 136.2 per cent. in the case of "Items on orders." This is a very re-

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markable increase in the activities of the Bureau and indicates very greatly improved sanitary conditions in the production and handling of foodstuffs in our State.

This increase in the amount of work performed by this Bureau was due in no small measure to the co-operation of Local Health Boards and in addition was expedited by the simplification of forms and report blanks.

The clerical work was performed by the same force that the Bureau had for the preceding year which indicates a considerable increase in the amount of work performed by the clerical force of this Bureau.

MERCANTILE BUREAU, FROM JULY 1, 1919 To JULY 1, 1920.

The work of this Bureau, chiefly of mercantile inspection, consists of notifying the inspectors of violations reported and of complaints received. The inspection work in connection with the mercantile question has been taken care of by two women inspectors and at times by one or two men of the force. This has resulted in the issuance of 71 orders by these inspectors; calling for 155 items, comprising sanitation, ten-hour violations, wages, child labor, employees and structural. Out of these 155 items 150 have been complied with and 3 cancelled. Of the 71 full orders issued 69 have been complied and 2 cancelled; also 13 additional orders from previous inspections have been fully complied with.

The total number of inspections of mercantile establishments during the year was 252 out of which 89 were general inspections.

The following will show a detailed report of the work of this Bureau:

Total inspections made,	252
Total orders issued,	71
Total orders complied,	80
Total orders cancelled,	2
Total items issued,	155
Total items complied,	3

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ITEMS.

	Issued	*Comp.*	*Canc.*
Sanitation,	36	35	1
Child Labor,	25	27	..
Ten-Hour,	49	15	..
Employes,	45	72	2
Discontinuance,	..	1	..
Structural,	2	..	..
	155	150	3

INSPECTORS' ORDERS.

	Issued	*Comp.*	*Canc.*
Moore General Welfare District "A,"	62	57	1
Slayback General Welfare District "B,"	9	22	1
Seder Bakery District "A,"	..	2	..
	71	81	2

INSPECTIONS.

Moore General Welfare District "A,"	220
Slayback General Welfare District "B,"	32
Seder Bakery District "A,"	..
	252

RESUME.

The following is a brief statistical review of the work that has been accomplished by the Bureau of Hygiene and Sanitation, Bakeries and Mines during the fiscal year ending June 30, 1920:

INSPECTION SHEETS EXAMINED.

Factories,	4,353
Bakeries,	3,378
Mines,	70
Quarries	19
Total,	7,820

Orders	*Issued.*	*Canc.*	*Comp.*
Factories,	980	234	1,118
Bakeries,	1,046	95	1,104
Mines,	111	..	73
Quarries,	97	..	13
Total,	2,234	329	2,308

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Items	*Issued*	*Canc.*	*Comp.*
Factories,	1,734	381	1,738
Bakeries,	3,057	224	2,019
Mines,	111	..	73
Quarries,	97	..	13
Total,	4,999	605	3,843

Plans	*Received*	*Approved*	*Rejected*	*Systems Accepted*
Sanitation,	87	74	4	8
Exhaust Vent.,	185	167	12	74
Total,	272	241	16	82

FEES RECEIVED.

Licensing Bakeries,	$ 2,332 00
Examining Plans,	$ 432 00
Total,	$ 2,764 00

HEARINGS ON OUTSTANDING ORDERS.

Newark,	118
Jersey City,	282
Camden,	12
Perth Amboy,	8
Trenton,	8
Total,	428

ENGINEERS' LICENSE, STEAM BOILER AND REFRIGERATION PLANT INSPECTION BUREAU.

J. F. Scott, Chairman.

The activities of the Engineers' License Bureau from July 1, 1919, to June 30, 1920, will be noted in the following summarization:

3117 Applications made for orginial licenses, at $2.00,	$ 6,234 00
751 Applications made for re-examination for higher grade licenses, at $ .50,	375 50
12477 Applications for renewal licenses already issued, at $1.50,..	18,715 50
	$25,325 00

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	Interest from 7-1-19 to 6-30-20, ...	150 06
	Balance in bank 7-1-19 - $7,505.00, less outstanding checks $65.50	
	True balance, ...	7,439 50
		$32,914 56
2114	Original licenses were issued, at $2.00, ...	$ 4,228 00
418	Tranfers to higher grade license by re-examination at $ .50, ...	209 00
11460	Renewals of licenses already issued, at $1.50, ...	17,190 00
		$21,627 00
	Cash returns, ...	378 00
		$22,005 00
	Balance in bank 7-1-20 $11,001.06, less outstanding checks $91.50, ...	
	True balance, which includes interest, ...	10,909 56
		$32,914 56

REMARKS AND RECOMMENDATIONS.

In comparing the above annual report covering July 1, 1919, to June 30, 1920, with preceding annual reports, it will be readily noted that the volume of applications, re-examinations received and examinations conducted throughout the State, also the moneys forwarded to the treasurer are consistently increasing.

It is obvious that the Engineers' License law should be amended so as to enable the Bureau and Department of Labor as a whole to obtain a better enforcement of the Law.

The engineers and firemen of this State, who have applied and received their State license in accordance with the law, look upon this license law as a protection to them in their daily work, as well as a safeguard to the industries of this State, by preventing incompetents from being placed in the care and operation of steam generating power plants. It is perfectly plain that the licensed engineers and firemen, and the industries who are complying with the law, have just cause for complaint when violations are brought to their attention. They feel—and rightly so—that the penalty-provisions of the license law should be amended, so as to be more affective, and thereby compel a greater respect for this statute.

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A bill was introduced in the legislature of 1920 which would give the members of the License Bureau and Labor Department authority to obtain summary action in flagrant violations that come to their attention. This bill was not enacted on account of the salary clause contained therein, which increased the salaries of the three members of the examining board. However, this objectionable feature in the license law has been removed by the 1920 legislature, as a law was enacted which authorizes the Commissioner of Labor and Civil Service Commission to adjust salaries in the future. With this objectionable feature to the legislature eye eliminated, may I respectfully and most earnestly recommend that the Engineers' License law be amended, simplifying the application of penalties for violations. May I, also, respectfully suggest that this could be accomplished by conferring on the Examining Board of Engineers authority to conduct hearings throughout the State where violations occur; and after such hearings, where the case or cases warrant, the transgressor should be summoned before any municipal, county or state official authorized to determine and apply the penalty.

The above procedure would undoubtedly, by such summary action reduce violations to a minimum, and eventually eliminate violations entirely; as is clearly demonstrated in other states and municipalities where such license laws are in operation.

During the year one-hundred and three examinations were held throughout the State:

The total number of persons examined,	4507
The total number of persons failed,	1308
The total number of persons cancelled,	167
The total number of persons successful and received licenses,	3032

Of this number

1st class engineers licenses issued,	30
2nd class engineers licenses issued,	266
3rd class engineers licenses issued,	778
Special,	19
Hoisting engineers licenses issued,	215
Portable engineers licenses issued,	145
Boiler operators licenses issued,	465

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Persons receiving licenses expressed in per cent., ... 67 1-3

In view of above report and supplementing license law enforcement recommendations, it is obvious that in justice to the great number of engineers and firemen who are obeying the mandates of the license law, others who practice this line of engineering, but who studiously try to evade the law, should be required to comply therewith, and only through the summary application of the penalty provisions will a full respect of the license law be obtained.

NEW JERSEY BOARD OF BOILER RULES.

During the past year the Steam Boiler Code as adopted by the New Jersey Board of Boiler Rules was printed in book form and delivered to the Steam Boiler Inspection Bureau.

The New Jersey Boiler Code Book is forwarded upon request to manufacturers of steam boilers throughout the country, especially, where such manufacturers are building boilers that are to be used in New Jersey. The manufacturer is required to construct steam boilers for this State as per specifications set forth in the New Jersey Code, in every detail. The herein printed plates were taken from different sections of the Boiler Code, and which I trust will give a concrete idea of the specifications which boiler manufacturers must adhere to in selecting material that is used in such construction. It will also be noted the high grade of workmanship that is essential in such construction, which is proportionately as valuable as material used.

Chemical properties and tests, ladle analysis, etc., in the manufacture of steel plates, iron castings and other material, are set forth throughout the Code uniformly, which will be noted in the few pages therefrom that follow:

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POWER BOILERS

Selection of Materials

1. Specifications are given in these Rules for the important materials used in the construction of boilers, and where given, the materials shall conform thereto.

2. Steel plates for any part of a boiler when exposed to the fire or products of combustion, and under pressure, shall be of firebox quality as designated in these Specifications for Boiler Plate Steel.

3. Steel plates for any part of a boiler, where firebox quality is not specified, when under pressure, shall be of firebox or flange quality as designated in these Specifications for Boiler Plate Steel.

4. Braces when welded, shall be of wrought iron of the quality designated in these Specifications for Refined Wrought Iron Bars.

5. Manhole and handhole covers and other parts subjected to pressure and braces and lugs, when made of steel plate, shall be of firebox or flange quality as designated in these Specifications for Boiler Plate Steel.

6. Steel bars for braces and for other boiler parts, except as otherwise specified herein, shall be of the quality designated in these Specifications for Steel Bars.

7. Staybolts shall be of iron or steel of the quality designated in the Specifications for Staybolt Iron or in the Specifications for Staybolt Steel.

8. Rivets shall be of steel or iron of the quality designated in the Specifications for Boiler Rivet Steel or in these Specifications for Boiler Rivet Iron.

9. Cross pipes connecting the steam and water drums of water-tube boilers, headers, cross boxes and all pressure parts of the boiler proper over 2-in. pipe size, or equivalent cross-sectional area, shall be of wrought steel, or cast steel of Class B grade, as designated in these Specifications for Steel Castings, when the maximum allowable working pressure exceeds 160 lb. per sq. in. Malleable iron may be also used when the maximum allowable working pressure does not exceed 200 lb. per sq. in., provided the form and size of the internal cross-section perpendicular to the longest dimension of the box, is such that it will fall within a 7 in. by 7 in. rectangle.

10. Mud drums of boilers used for other than heating purposes shall be of wrought steel, or cast steel of Class B grade, as designated in these Specifications for Steel Castings.

11. Pressure parts of superheaters, separately fired or attached to stationary boilers, unless of the locomotive type, shall be of wrought steel, or cast steel of Class B grade, as designated in these

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Specifications for Steel Castings.

12. Cast iron shall not be used for nozzles or flanges attached directly to the boiler for any pressure or temperature, nor for boiler and superheater mountings such as connecting pipes, fittings, valves and their bonnets, for steam temperatures of over 450 deg. fahr.

13. Water-leg and door-frame rings of vertical fire-tube boilers and of locomotive and other type boilers, shall be of wrought iron or steel, or cast steel of Class A or Class B grades, as designated in these Specifications for Steel Castings. The OG or other flanged construction may be used as a substitute in any case.

Ultimate Strength of Material used in Computing Joints

14. *Tensile Strength of Steel Plate.* In determining the maximum allowable working pressure, the tensile strength used in the computations for steel plates shall be that stamped on the plates as herein provided, which is the minimum of the stipulated range, or 55,000 lb. per sq. in. for all steel plates, except for special grades having a lower tensile strength.

15. *Crushing Strength of Steel Plate.* The resistance to crushing of steel plate shall be taken at 95,000 lb. per sq. in. of cross-sectional area.

16. *Strength of Rivets in Shear.* In computing the ultimate strength of rivets in shear, the following values in pounds per square inch of the cross-sectional area of the rivet shank shall be used:

Iron rivets in single shear,	38,000
Iron rivets in double shear,	76,000
Steel rivets in single shear,	44,000
Steel rivets in double shear,	88,000

The cross-sectional area used in the computations shall be that of the rivet shank after driving.

Minimum Thicknesses of Plates and Tubes

17. *Thickness of Plates.* The minimum thickness of any boiler plate under pressure shall be ¼ in.

18. The minimum thicknesses of shell plates, and dome plates after flanging, shall be as follows:

When the diameter of shell is	
36 In. or Under	Over 36 In. to 54 In.
¼ in.	5/16 in.
Over 54 In. to 72 In.	Over 72 In.
⅜ in.	½ in.

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19. The minimum thickness of butt straps for double strap joints shall be as given in Table 1. Intermediate values shall be determined by interpolation. For plate thicknesses exceeding 1¼ in., the thickness of the butt straps shall be not less than two-thirds of the thickness of the plate.

TABLE I. MINIMUM THICKNESSES OF BUTT STRAPS

Thickness of Shell Plates, In.	Minimum Thickness of Butt Straps, In.	Thickness of Shell Plates, In.	Minimum Thickness of Butt Straps, In.
¼	¼	17/32	7/16
9/32	¼	9/16	7/16
5/16	¼	5/8	½
11/32	¼	¾	½
⅜	5/16	⅞	⅝
13/32	5/16	1	11/16
7/16	⅜	1¼	¾
15/32	⅜	1¼	⅞
½	7/16		

20. The minimum thicknesses of tube sheets for horizontal return tubular boilers, shall be as follows:

When the Diameter of Tube Sheet is	
42 In. or Under	Over 42 In. to 54 In.
⅜ in.	7/16 in.
Over 54 In. to 72 In.	Over 72 In.
½ in.	9/16 in.

21. *Tubes for Water-Tube Boilers.* The maximum allowable working pressures for tubes used in water-tube boilers shall be for the various diameters and gages measured by Birmingham wire gage, as given in Table 2.

22. *Tubes for Fire-Tube Boilers.* The minimum thicknesses of tubes used in fire-tube boilers measured by Birmingham wire gage, for maximum allowable working pressures not exceeding 175 lb. per sq. in., shall be as follows:

Diameters 1 in. or over, but less than 2½ in.....No. 13 B.W.G.
Diameter 2½ in. or over, but less than 3¼ in.....No. 12 B.W.G.
Diameter 3¼ in. or over, but less than 4 in.....No. 11 B.W.G.
Diameter 4 in. or over, but less than 5 in.....No. 10 B.W.G.
Diameter 5 in.....No. 9 B.W.G.

For each increase of one gage in thickness above that shown in the table, the maximum allowable working pressure will be increased by 200 lb. divided by the diameter of the tube in inches.

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SPECIFICATIONS FOR BOILER PLATE STEEL

23. *Grades.* These specifications cover two grades of steel for boilers, namely: FLANGE and FIREBOX.

I. MANUFACTURE

24. *Process.* The steel shall be made by the open-hearth process.

II. CHEMICAL PROPERTIES AND TESTS

25. *Chemical Composition.* The steel shall conform to the following requirements as to chemical composition:

	FLANGE	FIREBOX
Carbon	Plates ¾ in. thick and under..0.12—0.25 per cent Plates over ¾ in. thick .....0.12—0.30 per cent	
Manganese	0.30—0.60 per cent	0.30—0.50 per cent
Phosphorus	Acid.... Not over 0.05 per cent Basic... Not over 0.04 per cent.	Not over 0.04 per cent Not over 0.035 per cent
Sulphur	Not over 0.05 per cent	Not over 0.04 per cent

26. *Ladle Analyses.* An analysis shall be made by the manufacturer from a test ingot taken during the pouring of each melt, a copy of which shall be given to the purchaser or his representative. This analysis shall conform to the requirements specified in Par. 25.

27. *Check Analyses.* Analyses may be made by the purchaser from a broken tension-test specimen representing each plate as rolled, which shall conform to the requirements specified in Par. 25.

III. PHYSICAL PROPERTIES AND TESTS

28. *Tension Tests.* *a.* The material shall conform to the following requirements as to tensile properties:

	FLANGE	FIREBOX
Tensile strength, lb. per sq. in.	55,000—65,000	55,000—65,000
Yield point, min., lb. per sq. in.	0.5 tens. str.	0.5 tens. str.
Elongation in 8-in., min., per cent (See Par. 29)	1,500,000 / Tens. str.	1,500,000 / Tens. str.

b. Should the above rule for minimum allowable elongation give a value of less than 24 per cent for firebox steel, the minimum allowable elongation shall be taken as 24 per cent, subject to the modification given in Par. 29.

c. If desired, steel of lower tensile strength than the above may be used in an entire boiler, or part thereof, the desired tensile limits to be specified, having a range of 10,000 lb. per sq. in. for both flange and firebox, the steel to conform in all respects to the other corresponding requirements herein specified, and to be stamped with the minimum tensile strength of the stipulated range.

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d. The yield point shall be determined by the drop of the beam of the testing machine.

29. *Modifications in Elongation.* *a.* For material over $^{11}/_{16}$ in. in thickness: From the figure representing the percentage of elongation required as determined in accordance with Par. 28 *a*, there shall be deducted an amount equal to four times the difference between the ordered thickness in inches and $^{11}/_{16}$ in., except that the minimum elongation required shall in no case be less than 20 per cent.

b. For material ¼ in. in thickness, the elongation shall be measured on a gage length of 6 in.

30. *a. Test Specimens.* Tension-test specimens shall be taken longitudinally from the bottom of the finished rolled material, and bent-test specimens shall be taken transversely from the middle of the top of the finished rolled material. The longitudinal test specimen shall be taken in the direction of the longitudinal axis of the ingot, and the transverse-test specimen at right angles to that axis.[1]

b. Bend Test. The bend-test specimen shall bend cold through 180 deg. without cracking on the outside of the bent portion, as follows: For material 1 in. or under in thickness, around a pin the diameter of which is equal to the thickness of the specimen; and for material over 1 in. in thickness, around a pin the diameter of which is equal to twice the thickness of the specimen.

31. *Homogeneity Tests.* For firebox steel, a sample taken from a broken tension-test specimen shall not show any single seam or cavity more than ¼ in. long, in either of the three fractures obtained in the test for homogeneity, which shall be made as follows:

The specimen shall be either nicked with a chisel or grooved on a machine, transversely, about 1/16 in. deep, in three places about 2 in. apart. The first groove shall be made 2 in. from the square end; each succeeding groove shall be made on the opposite side from the preceding one. The specimen shall then be firmly held in a vise, with the first groove about ¼ in. above the jaws, and the projecting end broken off by light blows of a hammer, the bending being away from the groove. The specimen shall be broken at the other two grooves in the same manner. The object of this test is to open and render visible to the eye any seams due to failure to weld or to interposed foreign matter, or any cavities due to gas bubbles in the ingot. One side of each fracture shall be examined and the length of the seams and cavities determined, a pocket lens being used if necessary.

32. *Specimens.* Tension and bend-test specimens shall be taken from the finished rolled material. They shall be of the full thick-

[1] Exceptions are made for tension-test specimens for plate which is rolled longitudinally with reference to position when used in a boiler shell; see Par. 190.

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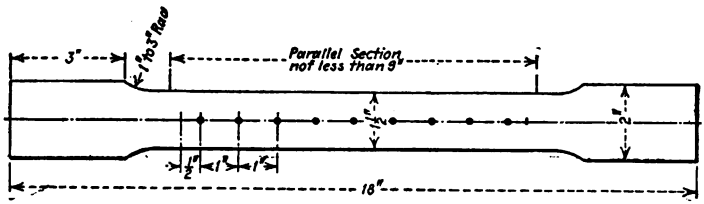

FIG. 1. STANDARD FORM OF TEST SPECIMEN REQUIRED FOR ALL TENSION TESTS OF PLATE MATERIAL.

ness of material as rolled, and shall be machined to the form and dimensions shown in Fig. 1; except that bend-test specimens may be machined with both edges parallel.

33. *Number of Tests.* *a.* One tension and one bend-test shall be made from each plate as rolled.

b. If any test specimen shows defective machining or develops flaws, it may be discarded and another specimen substituted.

c. If the percentage of elongation of any tension-test specimen is less than that specified in Pars. 28 and 29, and any part of the fracture is outside the middle third of the gaged length, as indicated by the scribe scratches marked on the specimen before testing, a retest shall be allowed.

IV. PERMISSIBLE VARIATION IN GAGE

34. *Permissible Variation.* The thickness of each plate shall not vary under the gage specified more than 0.01 in. (The overweight limits are considered a matter of contract between the steel manufacturer and the boiler builder.)

V. FINISH

35. *Finish.* The finished material shall be free from injurious defects, and shall have a workmanlike finish.

VI. MARKING

36. *Marking.* *a.* Each shell plate shall be legibly stamped by the manufacturer with the melt or slab number, name of manufacturer, grade and the minimum tensile strength of the stipulated range as specified in Par. 28, in three places, two of which shall be located at diagonal corners about 12 in. from the edge and one about the center of the plate, or at a point selected and designated by the purchaser so that the stamp shall be plainly visible when the boiler is completed.

b. Each head shall be legibly stamped by the manufacturer in two places, about 12 in. from the edge, with the melt or slab number, name of manufacturer, grade, and the minimum tensile strength of the stipulated range as specified in Par. 28, in such manner that the stamp is plainly visible when the boiler is completed.

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c. Each butt strap shall be legibly stamped by the manufacturer in two places on the center line about 12 in. from the ends with the melt or slab number, name of manufacturer, grade, and the minimum tensile strength of the stipulated range as specified in Par. 28.

d. The melt or slab number shall be legibly stamped on each test specimen.

VII. Inspection and Rejection

37. *Inspection.* The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the material ordered. The manufacturer shall afford the inspector, free of cost, all reasonable facilities to satisfy him that the material is being furnished in accordance with these specifications. All tests (except check analyses) and inspection shall be made at the place of manufacture prior to shipment, unless otherwise specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

38. *Rejection.* *a.* Unless otherwise specified, any rejection based on tests made in accordance with Par. 27 shall be reported within five working days from the receipt of samples.

b. Material which shows injurious defects subsequent to its acceptance at the manufacturer's works will be rejected, and the manufacturer shall be notified.

39. *Rehearing.* Samples tested in accordance with Par. 27, which represent rejected material, shall be preserved for two weeks from the date of the test report. In case of dissatisfaction with the results of the tests, the manufacturer may make claim for a rehearing within that time.

SPECIFICATIONS FOR BOILER RIVET STEEL

A. Requirements for Rolled Bars

I. Manufacture

40. *Process.* The steel shall be made by the open-hearth process.

II. Chemical Properties and Tests

41. *Chemical Composition.* The steel shall conform to the following requirements as to chemical composition:

Manganese	0.30–0.50 per cent
Phosphorus	not over 0.04 per cent
Sulphur	not over 0.045 per cent

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42. *Ladle Analyses.* An analysis to determine the percentages of carbon, manganese, phosphorus and sulphur shall be made by the manufacturer from a test ingot taken during the pouring of each melt, a copy of which shall be given to the purchaser or his representative. This analysis shall conform to the requirements specified in Par. 41.

43. *Check Analyses.* Analyses may be made by the purchaser from finished bars, representing each melt, which shall conform to the requirements specified in Par. 41.

III. Physical Properties and Tests

44. *Tension Tests.* *a.* The bars shall conform to the following requirements as to tensile properties:

Tensile strength, lb. per sq. in.	45,000–55,000
Yield point, min., lb. per sq. in.	0.5 tens. str.
Elongation in 8 in., min., per cent	1,500,000
but need not exceed 30 per cent	Tens. str.

b. The yield point shall be determined by the drop of the beam of the testing machine.

45. *Bend Tests.* *a. Cold-bend Tests*—The test specimen shall bend cold through 180 deg. flat on itself without cracking on the outside of the bent portion.

b. Quench-bend Tests—The test specimen, when heated to a light cherry red as seen in the dark (not less than 1200 deg. fahr.), and quenched at once in water the temperature of which is between 80 deg. and 90 deg. fahr., shall bend through 180 deg. flat on itself without cracking on the outside of the bent portion.

46. *Test Specimens.* Tension and bend-test specimens shall be of the full-size section of the bars as rolled.

47. *Number of Tests.* *a.* Two tension, two cold-bend, and two quench-bend tests shall be made from each melt, each of which shall conform to the requirements specified.

b. If any test specimen develops flaws, it may be discarded and another specimen substituted.

c. If the percentage of elongation of any tension test specimen is less than that specified in Par. 44 and any part of the fracture is outside the middle third of the gaged length, as indicated by scribe scratches marked on the specimen before testing, a retest shall be allowed.

48. *Permissible Variations in Gage.* The gage of each bar shall not vary more than 0.01 in. from that specified.

V. Workmanship and Finish

49. *Workmanship.* The finished bars shall be circular within 0.01 in.

50. *Finish.* The finished bars shall be free from injurious defects and shall have a workmanlike finish.

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VI. Marking

51. *Marking.* Rivet bars shall, when loaded for shipment, be properly separated and marked with the name or brand of the manufacturer and the melt number for identification The melt number shall be legibly marked on each test specimen.

VII. Inspection and Rejection

52. *Inspection.* The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the bars ordered. The manufacturer shall afford the inspector, free of cost, all reasonable facilities to satisfy him that the bars are being furnished in accordance with these specifications. All tests (except check analyses) and inspection shall be made at the place of manufacture prior to shipment, unless otherwise specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

53. *Rejection.* *a.* Unless otherwise specified, any rejection based on tests made in accordance with Par. 43 shall be reported within five working days from the receipt of samples.

b. Bars which show injurious defects subsequent to their acceptance at the manufacturer's works will be rejected, and the manufacturer shall be notified.

54. *Rehearing.* Samples tested in accordance with Par. 43, which represent rejected bars, shall be preserved for two weeks from the date of the test report. In case of dissatisfaction with the results of the tests, the manufacturer may make claim for a rehearing within that time.

B. Requirements for Rivets

I. Physical Properties and Tests

55. *Tension Tests.* The rivets, when tested, shall conform to the requirements as to tensile properties specified in Par. 44, except that the elongation shall be measured on a gaged length not less than four times the diameter of the rivet.

56. *Bend Tests.* The rivet shank shall bend cold through 180 deg. flat on itself, as shown in Fig. 2, without cracking on the outside of the bent portion.

57. *Flattening Tests.* The rivet head shall flatten, while hot, to a diameter 2½ times the diameter of the shank, as shown in Fig. 3, without cracking at the edges.

58. *Number of Tests.* *a.* When specified, one tension test shall be made from each size in each lot of rivets offered for inspection.

b. Three bend and three flattening tests shall be made from each size in each lot of rivets offered for inspection, each of which shall conform to the requirements specified.

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II. Workmanship and Finish

59. *Workmanship.* The rivets shall be true to form, concentric, and shall be made in a workmanlike manner.

60. *Finish.* The finished rivets shall be free from injurious defects.

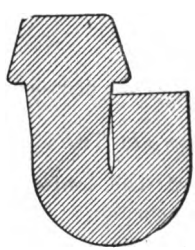

Fig. 2. The Bend Test for Rivets

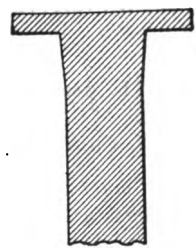

Fig. 3. The Flattening Test for Rivets

III. Inspection and Rejection

61. *Inspection.* The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the rivets ordered. The manufacturer shall afford the inspector, free of cost, all reasonable facilities to satisfy him that the rivets are being furnished in accordance with these specifications. All tests and inspection shall be made at the place of manufacture prior to shipment, unless otherwise specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

62. *Rejection.* Rivets which show injurious defects subsequent to their acceptance at the manufacturer's works will be rejected, and the manufacturer shall be notified.

SPECIFICATIONS FOR STAYBOLT STEEL

Requirements for Rolled Bars

63. Steel for staybolts shall conform to the requirements for Boiler Rivet Steel specified in Pars. 40 to 62, except that the tensile properties shall be as follows:

Tensile strength, lb. per sq. in.	50,000–60,000
Yield point, min., lb. per sq. in.	0.5 tens. str.
Elongation in 8 in., min., per cent.	1,500,000 / Tens. str.

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Also with the exception that the permissible variations in gage shall be as follows:

Permissible Variations in Gage. The bars shall be truly round within 0.01 in. and shall not vary more than 0.005 in. above, or more than 0.01 in. below the specified size.

SPECIFICATIONS FOR STEEL BARS

I. Manufacture

54. *Process.* The steel shall be made by the open-hearth process.

II. Chemical Properties and Tests

65. *Chemical Composition.* The steel shall conform to the following requirements as to chemical composition:

Phosphorus	Acid	not over 0.06 per cent
	Basic	not over 0.04 per cent
Sulphur		not over 0.05 per cent

The manufacturer shall afford the inspector, free of cost, all reasonable facilities to satisfy him that the castings are being furnished in accordance with these specifications. All tests (except check analyses) and inspection shall be made at the place of manufacture prior to shipment, unless otherwise specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

93. *Rejection.* *a.* Unless otherwise specified, any rejection based on tests made in accordance with Par. 84, shall be reported within five working days from the receipt of samples.

b. Castings which show injurious defects subsequent to their acceptance at the manufacturer's works will be rejected, and the manufacturer shall be notified.

94. *Rehearing.* Samples tested in accordance with Par. 84, which represent rejected castings, shall be preserved for two weeks from the date of the test report. In case of dissatisfaction with the results of the tests, the manufacturer may make claim for a rehearing within that time.

SPECIFICATIONS FOR GRAY IRON CASTINGS

95. *Process of Manufacture.* Unless furnace iron is specified, all gray castings are understood to be made by the cupola process.

96. *Chemical Properties.* The sulphur contents to be as follows:

Light castings	not over 0.08 per cent
Medium castings	not over 0.10 per cent
Heavy castings	not over 0.12 per cent

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97. *Classification.* In dividing castings into light, medium and heavy classes, the following standards have been adopted:

98. Castings having any section less than ½ in. thick shall be known as *light castings.*

99. Castings in which no section is less than 2 in. thick shall be known as *heavy castings.*

100. *Medium castings* are those not included in the above classification.

Physical Properties and Tests

101. *Transverse Test.* The minimum breaking strength of the "Arbitration Bar" under transverse load shall be not under:

Light castings	2500 lbs.
Medium castings	2900 lbs.
Heavy castings	3300 lbs.

In no case shall the deflection be under 0.10 in.

102. *Tensile Test.* Where specified, this shall not run less than:

Light castings	18,000 lb. per sq. in.
Medium castings	21,000 lb. per sq. in.
Heavy castings	24,000 lb. per sq. in.

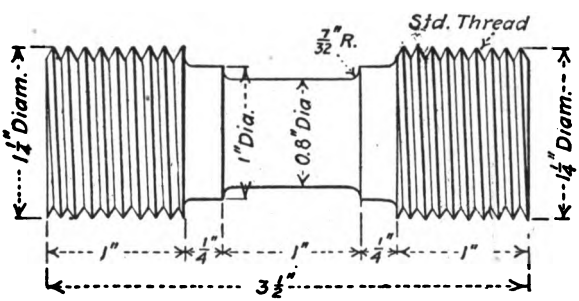

Fig. 5. Standard Form of Test Specimen Required for Tension Tests of Gray-Iron Casting Material

103. *Arbitration Bar.* The quality of the iron going into castings under specification shall be determined by means of the "Arbitration Bar." This is a bar 1¼ in. in diameter and 15 in. long. It shall be prepared as stated further on and tested transversely. The tensile test is not recommended, but in case it is called for, the bar as shown in Fig. 5, and turned up from any of the broken pieces of the transverse test shall be used. The expense of the tensile test shall fall on the purchaser.

104. *Number of Test Bars.* Two sets of two bars shall be cast from each heat, one set from the first and the other set from the

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last iron going into the castings. Where the heat exceeds twenty tons, an additional set of two bars shall be cast for each twenty tons or fraction thereof above this amount. In case of a change of mixture during the heat, one set of two bars shall also be cast for every mixture other than the regular one. Each set of two bars is to go into a single mold. The bars shall not be rumbled or otherwise treated, being simply brushed off before testing.

105. *Method of Testing.* The transverse test shall be made on all the bars cast, with supports 12 in. apart, load applied at the

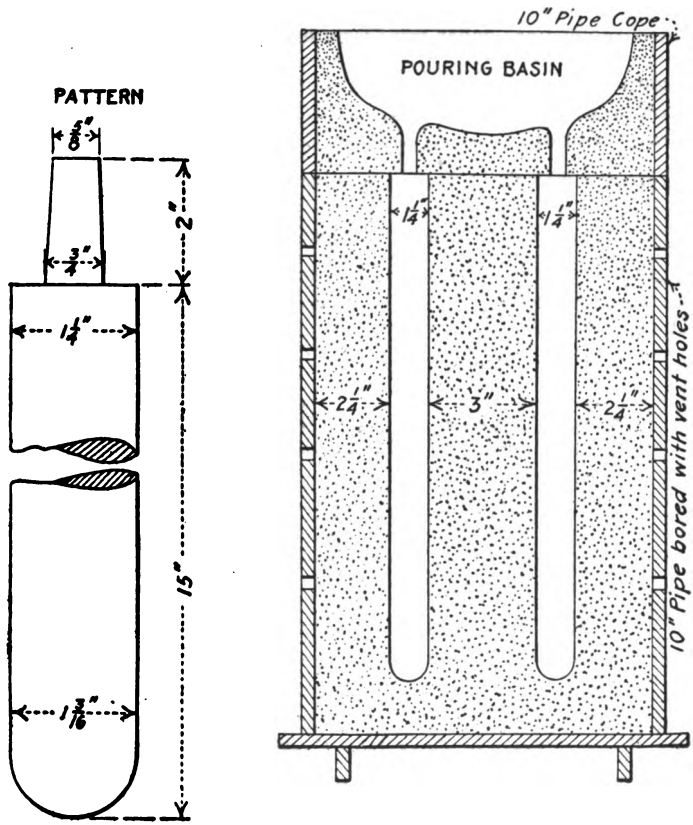

FIG. 6. DETAILS OF PATTERN AND MOLD REQUIRED FOR ARBITRATION BARS IN TESTING GRAY-IRON CASTING MATERIAL.

middle, and the deflection at rupture noted. One bar of every two of each set made must fulfill the requirements to permit acceptance of the castings represented.

106. *Mold for Test Bar.* The mold for the bars is shown in Fig. 6. The bottom of the bar is $^1/_{16}$ in. smaller in diameter than the

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'op, to allow for draft and for the strain of pouring. The pattern shall not be rapped before withdrawing. The flask is to be rammed up with green molding sand, a little damper than usual, well mixed and put through a No. 8 sieve, with a mixture of one to twelve bituminous facing. The mold shall be rammed evenly and fairly hard, thoroughly dried and not cast until it is cold. The test bar shall not be removed from the mold until cold enough to be handled.

107. *Speed of Testing.* The rate of application of the load shall be from 20 to 40 seconds for a deflection of 0.10 in.

108. *Samples for Analysis.* Borings from the broken pieces of the "Arbitration Bar" shall be used for the sulphur determinations. One determination for each mold made shall be required. In case of dispute, the standards of the American Foundrymen's Association shall be used for comparison.

109. *Finish.* Castings shall be true to pattern, free from cracks, flaws and excessive shrinkage. In other respects they shall conform to whatever points may be specially agreed upon.

110. *Inspection.* The inspector shall have reasonable facilities afforded him by the manufacturer to satisfy him that the finished material is furnished in accordance with these specifications. All tests and inspections shall, as far as possible, be made at the place of manufacture prior to shipment.

SPECIFICATIONS FOR MALLEABLE CASTINGS

111. *Process of Manufacture.* Malleable iron castings may be made by the open-hearth, air furnace, or cupola process. Cupola iron, however, is not recommended for heavy nor for important castings.

112. *Chemical Properties.* Castings for which physical requirements are specified shall not contain over 0.06 sulphur nor over 0.225 phosphorus.

Physical Properties and Tests

113. *Standard Test Bar.* This bar shall be 1 in. sq. and 14 in. long, without chills and with ends left perfectly free in the mold. Three shall be cast in one mold, heavy risers insuring sound bars.

163. *Rejection.* All bars of one size will be rejected if the test specimens representing that size do not conform to the requirements specified.

SPECIFICATIONS FOR LAPWELDED AND SEAMLESS BOILER TUBES

I. Manufacture

164. *Process.* *a.* Lapwelded tubes shall be made of open-hearth steel or knobbled, hammered charcoal iron.

b. Seamless tubes shall be made of open-hearth steel.

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II. Chemical Properties and Tests

165. *Chemical Composition.* *a.* The steel shall conform to the following requirements as to chemical composition:

Carbon	0.08—0.18	per cent
Manganese	0.30—0.60	per cent
Phosphorus	not over 0.04	per cent
Sulphur	not over 0.045	per cent

b. Chemical analyses will not be required for charcoal iron tubes.

166. *Check Analyses.* *a.* Analyses of two tubes in each lot of 250 (or on total order if less than 250) may be made by the purchaser which shall conform to the requirements specified in Par. 165. Drillings for analyses shall be taken from several points around each tube.

b. If the analysis of only one tube does not conform to the requirements specified, analyses of two additional tubes from the same lot shall be made, each of which shall conform to the requirements specified.

III. Physical Properties and Tests

167. *Flange Test.* *a.* For tubes not more than 6 in. diameter, having a thickness less than 10 per cent of the outside diameter, provided the thickness does not exceed No. 6 B. W. G., a test specimen not less than 4 in. in length shall have a flange turned over at right angles to the body of the tube without cracking or showing any flaw. This flange as measured from the outside of the tube shall have a width of from ⅛ in. to ½ in., the width between these limits to be not less than 10 per cent of the outside diameter of the tube. For other tubes the flange test is not required.

b. In making the flange test, the flaring tool and die block as shown in Fig. 7, may be used.

168. *Flattening Tests.* A test specimen 3 in. in length shall stand flattening between two parallel plates until the distance between the plates is not over five times the wall thickness, without showing cracks or flaws. In the case of lapwelded tubes, the test shall be made with the weld at the point of maximum bend.

169. *Hydrostatic Tests.* Tubes under 5 in. in diameter shall stand an internal hydrostatic pressure of 1,000 lb. per sq. in. and tubes 5 in. in diameter or over, an internal hydrostatic pressure of 800 lb. per sq. in., provided the fibre stress corresponding to these pressures does not exceed 16,000 lb. per sq. in.

Should the fibre stress corresponding to these pressures exceed 16,000 lb. per sq. in., the test pressure shall be determined by the following formula:

$$P = \frac{32000\,t}{D}$$

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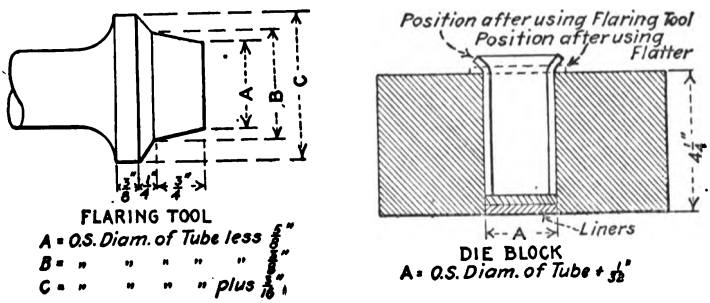

FIG. 7. DETAILS OF FLARING TOOL AND DIE BLOCK REQUIRED FOR MAKING FLANGE TESTS OF BOILER TUBES

where t is the wall thickness in inches; D is the inside diameter in inches. Lapwelded tubes shall be struck near both ends, while under the test pressure, with a 2-lb. steel hand hammer, or the equivalent.

170. *Test Specimens.* *a.* All test specimens shall be taken from tubes before being cut to finished lengths and shall be smooth on the ends and free from burrs. *b.* All tests shall be made cold.

171. *Number of Tests.* All tubes shall be subjected to the hydrostatic test. One of each of the physical tests specified shall be made from each of two tubes in each lot of 250 or less.

172. *Retests.* If the result of the physical tests of only one tube from any lot do not conform to the requirements specified in Pars. 167 and 168, retests of two additional tubes from the same lot shall be made, each of which shall conform to the requirements specified.

ETCH TESTS FOR CHARCOAL IRON

173. *Etch Tests.*[1] A cross section of tube may be turned or ground to a perfectly true surface polished free from dirt or cracks, and etched until the soft parts are sufficiently dissolved for the iron tube to show a decided ridged surface with the weld very distinct, while a steel tube would show a homogeneous surface.

IV. WORKMANSHIP AND FINISH

174. *Workmanship.* Finished tubes 3½ in. or under in outside diameter shall be circular within 0.02 in. and the mean outside diameter shall not vary more than 0.015 in. from the size ordered. For tubes over 3½ in. in outside diameter, these variations shall not exceed 0.5 per cent of the outside diameter. All tubes shall be carefully gaged with a B. W. G. gage and shall not be less than the gage specified. Tubes on which the standard slot gage specified will go on tightly at the thinnest point, will be accepted. The

[1] A solution of two parts of water, one part concentrated hydrochloric acid, and one part concentrated sulphuric acid is recommended for the etch test.

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length shall not be less, but may be 0.125 in. more than that ordered.

175. *Finish.* The finished tubes shall be free from injurious defects and shall have a workmanlike finish and shall be practically free from kinks, bends and buckles.

V. Marking

176. *Marking.* The name or brand of the manufacturer, the material from which it is made, and the pressure in pounds per square inch at which it was tested, shall be legibly stenciled on each tube.

VI. Inspection and Rejection

177. *Inspection.* All tests and inspection shall be made at the place of manufacture. The manufacturer of boiler tubes shall furnish the purchaser of each lot of tubes a statement of the kind of material of which the tubes are made, and that the tubes have been tested and have met all the requirements of these rules. This statement shall be furnished to the manufacturer using the tubes.

178. *Rejection.* Tubes when inserted in the boiler shall stand expanding and beading without showing cracks or flaws, or opening at the weld. Tubes which fail in this manner will be rejected and the manufacturer shall be notified.

CONSTRUCTION

Construction and Maximum Allowable Working Pressures for Power Boilers

179. *Maximum Allowable Working Pressure.* The maximum allowable working pressure is that at which a boiler may be operated as determined by employing the factors of safety, stresses, and dimensions designated in these Rules.

No boiler shall be operated at a higher pressure than the maximum allowable working pressure except when the safety valve or valves are blowing, at which time the maximum allowable working pressure shall not be exceeded by more than 6 per cent.

Wherever the term maximum allowable working pressure is used herein, it refers to gage pressure, or the pressure above the atmosphere, in pounds per square inch.

180. *a.* The maximum allowable working pressure on the shell of a boiler or drum shall be determined by the strength of the weakest course, computed from the thickness of the plate, the tensile strength stamped thereon, as provided for in Par. 36, the efficiency of the longitudinal joint, or of the ligament between the tube holes in shell or drum, (whichever is the least), the inside diameter of the course, and the factor of the safety.

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b. At intervals of not exceeding five years of service, the factor of safety of five shall be increased, if after a thorough internal and external inspection including hammer test and hydrostatic pressure test of 150 per cent of the working pressure allowed, the condition of the boiler is found to necessitate a reduction in pressure.

$$\frac{TS \times t \times E}{R \times FS} = \text{maximum allowable working pressure, lb. per sq. in.}$$

where

TS = ultimate tensile strength stamped on shell plates, as provided for in Par. 36, lb. per sq. in.

t = minimum thickness of shell plates in weakest course. in.

E = efficiency of longitudinal joint or of ligaments between tube holes (whichever is the least).

R = inside radius of the weakest course of the shell or drum, in.

FS = factor of safety, or the ratio of the ultimate strength of the material to the allowable stress. For new constructions covered in Part I, FS in the above formula = 5.

Boiler Joints

181. *Efficiency of a Joint.* The efficiency of a joint is the ratio which the strength of the joint bears to the strength of the solid plate. In the case of a riveted joint this is determined by calculating the breaking strength of a unit section of the joint, considering each possible mode of failure separately, and dividing the lowest result by the breaking strength of the solid plate of a length equal to that of the section considered. (See Appendix, Pars. 410 to 416, for detailed methods and examples,)

182. The distance between the center lines of any two adjacent rows of rivets, or the "back pitch" measured at right angles to the direction of the joint, shall have the following minimum values:

a. If $\frac{P}{D}$ is 4 or less, the minimum value shall be $2\,D$;

b. If $\frac{P'}{D}$ is over 4, the minimum value shall be:

$$2D + 0.1\ (P - 4D)$$

where

P = pitch of rivets in outer row where a rivet in the inner row comes midway between two rivets in the outer row. in.

P = pitch of rivets in the outer row less pitch of rivets in the inner row where two rivets in the inner row come between two rivets in the outer row, in. (It is here

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assumed that the joints are of the usual construction where the rivets are symmetrically spaced.)

D = diameter of the rivet holes, in.

183. On longitudinal joints, the distance from the centers of rivet holes to the edges of the plates, except rivet holes in the ends of butt straps, shall be not less than 1½ and not more than 1¾ times the diameter of the rivet holes; this distance to be measured from the center of the rivet holes to the calking edge of the plate before calking. The plate edge shall be beveled to an angle not sharper than 70 deg. to the plane of the plate and as near thereto as practicable.

184. *a. Circumferential Joints.* The strength of circumferential joints of boilers, the heads of which are not stayed by tubes or through braces, shall be at least 50 per cent of that required for the longitudinal joints of the same structure.

b. When 50 per cent or more of the load which would act on an unstayed solid head of the same diameter as the shell, is relieved by the effect of tubes or through stays, in consequence of the reduction of the area acted on by the pressure and the holding power of the tubes and stays, the strength of the circumferential joints in the shell shall be at least 35 per cent of that required for the longitudinal joints.

c. In the portion of circumferential joints of horizontal return tubular boilers, exposed to the products of combustion, the shearing strength of the rivets shall be not less than 50 per cent of the full strength of the plate corresponding to the thickness at the joint.

185. When shell plates exceed 9/16 in. in thickness in horizontal return tubular boilers, the portion of the plates forming the laps of the circumferential joints, where exposed to the fire or products of combustion, shall be planed or milled down, as shown in Fig. 8, to ½ in. in thickness, provided the requirement in Par. 184 is complied with.

I feel it would be justifiable to incorporate the complete Code in this summation, but in view of the fact that the entire Boiler Code consists of one hundred and thirty-six pages, not including the Steam Boiler Inspection Regulations, and as the Code can be readily obtained from this Bureau, I am confident the few plates incorporated will meet with approval, and suffice to convey to all who may peruse this report—the utmost care and exactness that was in evidence during the time that the New Jersey Board of Boiler Rules were conducting hearings and investigations. The Board kept in mind at all times their desire to

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adopt the very best specifications and regulations covering Steam Boiler construction in existence, which were arrived at through elaborate exhaustive tests and experiments conducted throughout the country by the Engineering profession and extended through several decades.

In furthering the best interests of the users of steam boilers in this State, and in order to maintain the high standard which the New Jersey Board of Boiler Rules inaugurated through the adoption of the present Boiler Code, it was essential that New Jersey be represented on the Boiler Code Committee of the American Society of Mechanical Engineers. New Jersey has obtained representation on this Committee, as outlined in previous report, through the invitation of the Society given in recognition of the progressive strides this State has made, evidenced primarily through adopting and enforcing a boiler code that has met with their entire approval.

It is obvious that through the New Jersey representative attending these meetings, assisting in their investigations and deliberations, New Jersey is in a position to be in the forefront at all times; as the Board is enabled to keep in touch with new design, construction and interpretations of present regulations, or any new engineering features which occur in this line of engineering, and which is readily in turn adopted by the New Jersey Board if found to be for the best interest of the State.

During the year the New Jersey Representative attended to the entire fourteen meetings conducted by the Boiler Code Committee of the above Society, and I do not hesitate to state that the assistance and co-operation derived from such association has been of inestimable value to the industries and the State as a whole.

In every case throughout the year where new boilers were being installed, we have received entire co-operation from the Manufacturers, Insurance Companies and Engineers, through their complying with the New Jersey Boiler Code during construction, installation, and final operation.

I feel that it is needless to remark the feeling of confidence the purchaser of such apparatus experiences and expresses from

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time to time, recognizing the fact that State supervision in Steam Boiler Engineering is one of his most valued assets and protection. We have had a few cases where dealers of boilers of inferior construction attempted to have the same admitted in this State; but the impossibility of such practice and permission being pointed out to them in each instance, has resulted in such requests practically ceasing.

In closing this report, I confidently look to the time when there will not be a boiler in the State of New Jersey other than that which is constructed in accordance with the New Jersey Steam Boiler Code.

STEAM BOILER INSPECTION BUREAU.

In the function of the Steam Boiler Inspection Division—during the last year—it will be noted by perusing the following financial report that a healthy increase in steam boiler inspections have been conducted.

7216	First Inspections and Re-inspections, at $1.00,	$ 7,216 00
	Balance in Bank 7-1-19,	138 00
	Interest on deposits from 7-1-19 to 6-30-20,	18 12
		$ 7,372 12
5750	Boiler certificates of Internal Inspections and Re-inspections issued, at $1,	5,750 00
	Cash returns account cancellations and excess fees,	229 00
	Balance in Bank including interest 7-1-20,	1,393 12
		$ 7,372 12

Received during the year 22 United States Railroad Administration reports and 488 Manufacturers' Data Reports.

In noting above it is unnecessary to remark on the substantial revenue that the State receives therefrom.

Under our perfected method of receiving inspection reports, we have adopted a uniform standard report. This we trust we will be able to maintain, owing to the fact that these forms of reports are acceptable and used by the various States, municipalities, manufacturers and inspection bureaus throughout the country.

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An inspection and complete report is followed up on all steam boilers that are built for this State, dating from the time the boiler is being built by the manufacturer. During the course of construction, an authorized inspector supervises and records the progress of construction.

The inspector's report is made out on what is known as a Manufacturers' Data Report sheet. Upon the completion of the construction of this boiler an inspector conducts a final shop inspection; the manufacturers then receive a copy of the inspector's report; the inspector retains a report for his company, and a report of such boiler is filed in the Steam Boiler Inspection Bureau of this State. A sample of such report follows:

STATE OF NEW JERSEY—DEPARTMENT OF LABOR
DIVISION OF ENGINEERS' LICENSE AND STEAM BOILER INSPECTION.

Manufacturer's Data Report of Steam Boilers, as Required by the Provisions of the Rules Formulated by the New Jersey Board of Boiler Rules on the Construction of Steam Boilers.

NOTE: This data report must be mailed to the ENGINEERS' LICENSE AND STEAM BOILER INSPECTION BUREAU, DEPARTMENT OF LABOR, STATE HOUSE, TRENTON, N. J., by the manufacturer before the boiler is shipped after inspection has been made by an approved inspector.

1. Boiler manufactured by .....at.....
2. Boiler manufactured for .....of.....
3. TYPE OF BOILER .....Blue Print No.....
4. Shell plates and butt straps made by .....
5. (*a*) Mill test report on shell plates .....Yield point.....
   (Tensile strength, lb. per sq. in.) (Lb. per sq. in.)
   (*b*) Elongation (In 8 in.)....%. Phos. o....%. Sul. o....%. Man o....to o....%.
6. Mill test report on butt straps..... Thickness.....in.
   (Brand and tensile strength.)
7. Heat number .....
8. Stamps on shell plates.....Thickness.....in.
   (Brand and tensile strength.)
9. Heat number .....
10. Furnace sheets made by.....Stamped.....
    (Brand and tensile strength.)
    Thickness.....in.
11. Heads made by.....Stamped.....
    (Brand and tensile strength.)
    Thickness.....in.

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12. Rivets made by .....Material.....
13. Stays made by.....Material.....
14. Channel or angle irons on heads.....Upper tubes to shell.....in.
(No. and size on each head.)
15. (*a*) Stays above tubes .....
(No. each head and type (through, head to head, or diagonal, welded or weldless) and net cross-sectional area of each size of each type.)
(*b*) .....Area to be stayed.....sq. in.
(Each head above tubes.)
(*c*) Stays below tubes .....L.....
(No. each head and type (through, head to head, or diagonal, welded or weldless) and net cross-sectional area of each size of each type.)
(*d*) .....Area to be stayed.....sq. in.
(Each head above tubes.)
16. (*a*) Stay bolts: Made by.....Material.....Size.....sq. in.
(Area at bottom of thread.)
(*b*) Maximum pitch of .....in. X.....in.
(Circumferential (or horizontal) X vertical.)
17. Shell: Diam.....in. Length over all....ft....in. No. of courses.....
(Inside of outside course)
18. (*a*) Longitudinal joints: Type of .....Riveting.....
(Double, triple, quad., etc.)
Diam. rivet holes.....in. Pitch of rivets.....in. X.....in. X....in.
(Minimum pitch on each row.)
Efficiency of joint.....%
(*b*) Circumferential joints: Type of.....Riveting.....
Diam. rivet holes.....in. Pitch of rivets.....in. X.....in. X....in.
(Minimum pitch on each row.)
Efficiency of joint.....%
19. If Worthington, Stirling, Hazleton, Climax, B. & W. cross Drum or similar type thickness of tube sheet.....in.
20. Method of re-enforcing .....
(Thickness of plate, diam., and pitch of rivet holes.)
21. Pitch of tubes.... X....Diam. of tube holes....in. Efficiency of ligament.....%.
22. Heads of tube sheets.....Radius of bump....in. Area to be stayed....
(Thickness, flat or bumped.) (Each head above and below tubes.)
23. Tubes: No.....Gage.....Diam.....in. Length.....ft.....in.
24. Manholes: .....Re-enforcement.....
(Number.) (Size and location of each.)
25. Hand holes: .....
26. Steam outlets: No.....Material of nozzle or reinforcement..... Size .....in.
(Cast steel or cast-iron, pressed steel or steel plate.)
27. Furnaces: No.....Thickness of plate.....in. Internal diam.....
Grate area .....sq. ft.
28. Type.....No. of sections..Length each..ft..in. Longitudinal seams..
(Corrugated, Adamson ring, etc.)
29. Safety valve outlets: No.....Size....Feed water connection.....in.
Bottom blow-off connection.....in.
30. Fusible plug: No.....Diam. and material of filling.....Location.....
31. Method of supporting boiler .....
32. Weakest part.....Bursting pressure.....Factor of safety.....
33. Constructed for a max. allow. work. pressure of.....lb. per sq. in. Tested to.....lb. per sq. in.
(Hydrostatic pressure.)

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34. Dome: Diam....in. Plate....in. Longitudinal seam....Efficiency....%
35. Riveted to shell.....Head.....Bracing.....
(No. of rows.) (Thickness, flat or bumped.) (Radius of bump or No., and style of braces.)
36. Opening under dome .....
37. If boiler has a dome, send working drawing of dome, also showing connection to boiler and openings in shell under dome.

REMARKS: .....

.....

We certify the above data to be correct and that all details of MATERIAL, CONSTRUCTION and WORKMANSHIP on this boiler conform to the NEW JERSEY BOARD OF BOILER RULES.

(Signed) .....
(Manufacturer.)

By .....

Received.....19.... Checked .....19.... By.....
(Authorized State or Insurance Inspector.)

Rules allow a max. allow. work. pressure of.....lb. per sq. in., this being based on .....

Upon the receipt of the above data report and checking up of same, so as to determine whether the boiler has been constructed in accordance with the New Jersey standard regulations, a permit is issued allowing said boiler to be removed from the shop and installed for operation in New Jersey. After the boiler has reached its destination or point of installation, an examiner of this Bureau or authorized inspector, is required to see that boiler or boilers are installed in accordance with the New Jersey Standards covering installations. In the installation of said boiler, the utmost care is taken in seeing to it that the boiler is properly supported, fitted with extra heavy fittings, safety appliances, and in fact everything that will tend to a safe operation and long life of the same.

After completion of installation, a final complete internal and external inspection is conducted, including a hydrostatic test before the same is put in operation. During this final inspection, the authorized inspector fills out a second inspection report which is practically a follow-up report from the preceding Manufacturers' Data report. The purpose of this is to enable the Bureau to check up the original Manufacturers' Data report with this second report. If these boilers, with the result of the two inspections, are found to check up correctly after a second report has been received in this Department, a Steam Boiler Certificate is

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issued to the owner covering such boiler, said certificate being good for one year unless countermanded for cause. The form of certificate will be noted as per following plate:

STATE OF NEW JERSEY

DEPARTMENT OF LABOR

Engineer's License and Steam Boiler Inspection Bureau Certificate of Steam Boiler Inspection

In Accordance with

Chapter 213, Laws of 1918

Name of user .....Boiler No. and Type.....

Street .....Inspection date .....

Town ..... State Number .....

Date of make .....

Length of shell or drum .....ft.....in.

Thickness of shell plates .....in.

Built by .....

Diameter of shell or drum .....in.

Percentage of strength of longitudinal joint .....

This is to Certify that the herein-described Steam Boiler

Inspected. by .....
(Labor Department or Insurance Company.)

May be operated at a pressure not to exceed .....lbs. per square inch.

STEAM BOILER INSPECTION DIVISION
DEPARTMENT OF LABOR

Checked by

.....

.....

LEWIS T. BRYANT,

..... Commissioner of Labor.

Examining Engineers.

Boiler Inspected by

.....

Inspector of Boilers.

This Certificate is good for one year from date unless countermanded for cause.

Post Under Glass In Conspicuous Place in Engine or Boiler Room.

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Upon issuing of the above certificate, a State Number is applied to this boiler, such number being attached in brass or bronze in a conspicuous part of the boiler. This State number acts as a permanent record of said boiler and is maintained throughout the life of same.

Under the program as outlined above, we have passed or accepted during the year four hundred eighty-eight (488) new boilers, all of which were or are being installed throughout the State in the different industries, institutions, etc.

In addition thereto we have passed inspection on twenty-two (22) boilers of various types under the United States Railroad Administration, and which are being used by the railroads in New Jersey.

The above will be noted, only touches on boilers of new construction. In addition to the above construction and inspection work, we have passed on the inspection of seven thousand, two-hundred sixteen (7,216) boilers. The number of certificates issued thereon as a result of such inspection are five thousand, seven hundred fifty (5,750).

I wish to call your attention to the fact that the above covers existing installations, or boilers that were already in operation in this State before our Steam Boiler Regulations became effective.

I trust it is also in order to mention that before certificates of permission for operation are issued on boilers known as Existing Installations, in numerous instances, Inspection Bureau has required the owner of such boilers to make the necessary repairs and changes so as to put the boiler or boilers in safe condition for operation. After this order has been issued, outlining the necessary repairs that must be made, the certificates are held in abeyance until such compliance has been adhered to. Upon receipt of proper report indicating that repairs have been completed, a certificate is also issued on the boiler, which is good for one year unless countermanded for cause.

By following out the above procedure, it is readily seen that steam boilers in operation in this State are kept in good safe operating condition insofar as it is humanly possible to so do.

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It has been frequently necessary for members of the Examining Board to conduct inspections from time to time, pass on repairs, decide on condemnation cases, and in fact settle all or any disputes that arise, especially where the inspector finds that the boiler is in such condition that the decreased pressure is vitally necessary.

Owing to the ever increasing demands that Examiners are called upon to perform pertaining to steam boiler inspection regulations, it is obvious that additional State Steam Boiler Inspectors should be appointed in the very near future.

I would also respectfully recommend that necessary legislation be enacted at as early a date as possible by amending the present Steam Boiler Inspection Law, so as to include the inspection of all Air and Other Pressure Vessels; as it has come to the notice of this Bureau, and also to the Factory Inspectors in the Department of Labor, in their duties conducted throughout the State, that the method and matter in which Air and Other Pressure Vessels are maintained and operated is vitally dangerous to all persons and employees in the immediate vicinity.

REFRIGERATION CODE AND INSPECTIONS.

The New Jersey Code covering the regulation and inspection of refrigeration plants is nearing completion, and we are looking forward to inaugurating a thorough inspection system of refrigerating plants throughout the entire State in the near future. The inspection of the above type of apparatus will be conducted along the same lines as are now enforced covering Steam Boiler Inspection. All safety appliances will be installed on refrigerating apparatus where found necessary. Emergency kits in case of accident will also be an essential equipment. In fact, under State inspection every precautionary measure will be observed that will tend to decrease to a minimum the possibility of accident or explosion in this type of plant.

In closing this yearly report permit me to mention the inestimable value it is obvious the New Jersey Museum of Safety, 571 Jersey Ave., Jersey City, will be in relation to the operation of the license and inspection Bureaus. The Museum upon its com-

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pletion will have completely installed a steam boiler outfit including all connections and safety appliances, also a complete refrigerating equipment will be on exhibition, various types of valves, safety guards, etc., which are of accepted standard covering Steam Engineering practice in this State.

As another adjunct there will also be exhibited samples of fractured longitudinal joints, defective tubes, corroded braces, and boiler plate which will serve to point out to all interested the apparent dangers imminent when such conditions prevail. There will also be available specifications, blue-prints, and other data which will all tend to guide and instruct the Engineer, Manufacturer or any interested persons who are contemplating new installations or are desirous of equipping their present installations in accordance with up-to-date New Jersey Standards.

It is apparent that with such co-operation and practical demonstrations, the industries in this State, the employees therein and others will have every advantage and opportunity to guard against dangerous explosions, accidents and the resultant loss of life.

Conclusion—

In reviewing the functions of the License and Inspection Bureaus as outlined in these reports, it is obvious that the growth of these Bureaus since their inception is remarkable. It is essential, in order to enable the Bureaus to cope with their ever increasing duties and obtain proper compliance with the law, additional field men will be a necessary adjunct from time to time in the near future.

The Bureaus are self supporting and do not require a dollar of the State's money for their maintenance and operation, but in reality pay a substantial net revenue to the State annually. Increasing the personnel of these Bureaus would also increase the annual revenue to the State.

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WORKMEN'S COMPENSATION BUREAU.

WILLIAM E. STUBBS, SECRETARY OF BUREAU, DEPUTY COMMISSIONER OF COMPENSATION.

In reviewing the work of the Compensation Bureau during the past year, one feature stands out prominently as indicating need of improvement by amendment. We refer to Section nineteen of Chapter 149, Laws of 1918, providing for a trial de novo in the Common Pleas Court in appeal from the judgment of a Deputy Commissioner.

Experience shows that this privilege is used entirely too freely by some attorneys willing to take another chance for a favorable determination. There certainly can be no warrant for the unreasonable number of appeals that have been taken.

Another fact which is brought to light by experience is that the evidence presented at the trial de novo does not always agree with that previously given before the Official of this Bureau. In fact, it is sometimes so at variance therewith that the Judge of the Court can not do other than render a reversing decision. Not only are statements and figures altered but new witnesses are frequently put on the stand with the result of producing quite a different case. Also the indications are that the first trial is sometimes used as a foil to ascertain the features of the opponent's case, to indicate a line of attack or defense in the trial de novo. In fact, an honest litigant, suspecting this on the part of the adversary, may even be compelled to permit a judgment by default in order to secure a fair trial.

For a number of excellent reasons, therefore, the law should be amended so as to give this Bureau final and conclusive jurisdiction on all questions of fact, and permit appeal only on questions of law.

Early in the year which has just closed, we took up for consideration the subject of direct settlement of compensation claims, a matter which was giving the authorities of the adjoining State of New York so much concern, and endeavored to devise means of ascertaining the situation in New Jersey with regard to this phase of the work. To require every injured man

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to come before a Deputy Commissioner seems both unnecessary and unwise. Without doubt the vast majority of cases are correctly disposed of. An act requiring every injured man to appear in person at one of our offices would entail in the aggregate a considerable economic loss.

Such a requirement would surely be disregarded in so many cases as to become inoperative. After careful study of the situation we have inaugurated the plan of advising the injured of the settlement proposed by the employer or carrier, furnishing him at the same time with a list of the various offices in different cities of the State, and advising him to call upon the official in charge for a personal review of his case. One month is allowed for the accomplishment of this, and the agreement is officially approved by this Bureau if the injured, or someone for him, fails to appear.

The record of such cases as are thus brought up, is then reviewed personally with the injured, and arrangement made for medical examination, following which if the compensation for permanent injury or other phase of the matter seems inadequate, steps are taken to bring about a correction, securing to the injured just compensation.

During the past eight months the notice indicated above has been sent to 10,541 injured workers, and as a result 1,116 persons have reported to our offices. Settlements in the majority of cases have been found to be correct; 107 cases, however, have called for correction of shortages, ranging from $1.66 to $1,800. The total shortage in these 107 cases was $25,642.96, an average of $239.65.

The plan we have put into operation appears, therefore, to be a reasonable and workable solution of the direct settlement question, and there does not at this time seem to be need of any remedial legislation.

As the months pass, one interesting and possibly significant fact is noticeable, the number of errors discovered by the above method is decreasing each month. This may be but a coincidence; on the other hand, it may be an indication that our close supervision of settlements is bringing about more careful atten-

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tion to the details of each case on the part of those effecting the adjustments.

One thing, however, is beyond controversy. The close supervision provided by the plan now in operation is absolutely essential to correct errors due either to imperfect knowledge of the law or to carelessness.

Another very important division of our work is the close co-operation of this Bureau with the Rehabilitation Commission, which is doing such valuable work. Under the arrangement which has been devised, each case coming before a Deputy Commissioner is considered with a view to restoration of physical function.

If conditions indicate possibilities in this direction, the case is referred to one of the Bureau physicians, and upon his reporting favorably, the injured is directed to report to the Rehabilitation Clinic, a settlement of his claim being deferred meanwhile. If reduction or removal of permanent injury seems probable, the insurance carrier is advised and its co-operation invited to the extent of meeting such cost as may be incurred in return for a reduction in compensation payable.

At the close of the treatment the case is referred back to the Compensation Bureau and a final settlement effected. In the majority of cases, the outcome is a net gain to everybody. The carrier pays out less as compensation and the injured is benefited in a way which can not be financially estimated. It is difficult to conceive how the Rehabilitation Commission could accomplish to the fullest its legitimate function without the co-operation and close co-ordination of the Bureau.

ADMINISTRATIVE WORK.

It is interesting to note by comparing the present figures with those of previous years, that each year a larger proportion of the total number of cases come under the direct supervision of the Bureau. The records indicate that over twenty-five percent of all of the non-fatal compensative cases of the State come up for consideration and guidance, while actual informal awards are made in nearly twenty percent of all cases. With regard to fatal

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cases the percentage is much greater, three-fourths of such claims coming on for hearing. Considering these statements in connection with the fact that the injured in every other case is notified that he can have his settlement personally reviewed by visiting one of our regular offices, it will be seen that the supervision of all settlements in New Jersey is about as complete as can reasonably be desired.

	New Cases.	*Fatal.*	*Hearings.*	*Awards.*	*Dismissed.*	*Reopened.*
George J. Jaeger—						
Jersey City, ...	1,473	50	1,196	897	96	45
Elizabeth, ...	5	..	4	8	1	..
Plainfield, ...	....	..	2	...	..	..
Totals, ...	1,478	50	1,202	905	97	45
Harry J. Goas—						
Newark, ...	1,331	10	1,483	945	157	58
James O. Boyd—						
Paterson, ...	474	24	694	343	57	35
Elizabeth, ...	265	18	336	190	18	12
Phillipsburg, ..	32	5	34	16	10	..
Asbury Park, ..	45	4	39	20	7	..
Dover, ...	46	7	39	18	4	..
Totals, ...	762	58	11,142	587	96	47
Chas. E. Corbin—						
Atlantic City ..	58	4	83	30	1	..
Bridgeton, ...	15	..	24	9	..	..
Camden, ...	242	36	510	130	1	..
New Brunswick,	98	11	188	66	3	4
Perth Amboy, .	79	5	156	55	4	..
Salem, ...	6	3	3	..	..	..
Newark, ...	...	..	3	2	..	..
Somerville, ...	1	..	1	..	..	..
Jersey City, ...	1	..	1	..	1	..
Mt. Holly ,....	1	..	1	1	..	..
New York, ...	...	..	1	..	..	..
Riverside, ...	...	1	1	..	..	..
Toms River, ...	1	..	1	1	..	..
Totals, ...	502	60	973	294	10	4
Grand totals,.	4,173	178	4,800	2,731	360	154

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The filing of a petition for a formal determination does not necessarily mean that the parties must be put to the inconvenience of a trial, for the Bureau has constantly in mind the guiding of the case to a settlement by an equitable agreement, and the record shows that, of the 312 cases terminating favorably to the petitioner, 120 were adjusted by bringing the parties together in an acceptable agreement meeting the approval of the Bureau. This is a trifle better than one out of each three cases. The preceding tables include the hearings and awards in the following:

RECORD OF FORMAL PETITIONS FOR JUDICIAL ACTION.

	1919	1920	2 years
Formal petitions received,	356	429	785
Disposed of without legal procedure,	30	16	46
Open cases being handled informally,	..	9	..
Cases filed and docketed,	309	404	713
Closed by agreement,	65	55	120
Closed after formal hearing and award,	76	116	192
Closed by dismissal after hearing,	25	102	127
Withdrawn,	..	63	63
Open Cases at end of year,	143	..	211

COMMUTATIONS.

Owing to the greatly decreased purchasing power of money during the past year, one can readily appreciate depreciation in value of compensation. This has caused a heavy increase in the number of petitions for commutation, and has compelled the granting of many such applications in order to prevent actual hardship.

The records of the year indicate that seventy (70) commutations and forty-two (42) partial commutations, together with thirteen (13) advance settlements without discount, were authorized by the various Deputy Commissioners as follows:

Wm. E. Stubbs,	20
Geo. J. Jaeger,	21
Harry J. Goas,	27
James O. Boyd,	21
Chas. E. Corbin,	33

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In addition two commutations were made without authorization by the Bureau.

The purpose of a majority of these lump sum settlements may be summarized as follows:

To return to native country,	31
To purchase a brace,	1
To enter business,	35
For medical and surgical expenses,	3
To meet various emergencies,	13
To purchase a home,	10
To make alterations to house,	1
To leave the State,	1
To buy a lot,	1
To pay off mortgage,	4
To attend business college,	1
To bring family to America,	1
To enter military service,	1
By request of the U. S. Railroad Administration,	7

Statistical Report.

NON-FATAL ACCIDENTS.

Total number of non-fatal accidents received,	15,557
Cases not required (under ten days),	437
Lost cases (man disappeared, etc.),	53
New York and Penn. Cases,	10
Horseplay,	2
Independent Contractor,	1
Interstate Commerce,	2
Not in the course of employment,	5
Dropped, not established,	2
Offered, but refused,	5
Third Party,	44
Illegal Contract of Hiring,	8
Maritime,	17
Natural Death,	2
One Year Limit,	2
Compromise Settlement, doubtful status,	13
Lump Sum, not authorized,	2
Number of Cases Closed,	13,912
Section I Cases,	54
Being of Total Closed,	.4%
Section II Cases,	13,858
Being of the Total Closed,	99.6%
Number of Total Disability Cases,	11
Partial Disabilities of a Permanent Nature,	3,034

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Temporary Disabilities,	10,813
Cases Reviewed Requiring Medical Aid,	13,855
Medical Aid Reported Supplied to	13,855
Number of Cases Reviewed Entitled to Compensation,	13,858
Number of Cases Approved,	13,763
Total Compensation Reported,	$2,038,607 59
Average Compensation per case,	$ 147 11
Gratuitous,	$ 36,380 85

FATAL CASES.

Total Number of Fatal Accidents Received,	229
Interstate Commerce,	3
Case Not Established,	1
Involving Burial Only,	82
Closed, not signed,	7
Doubtful Dependency,	3
Intoxication,	1
Third Party,	3
Compromise Settlement,	3
Illegal Contract of Hiring,	1
Independent Contractor,	1
Lost Case,	1
One Year Limit,	1
Total Burial Reported,	$ 32,161 17
Average Cost per Case,	$ 119 52
Total Compensation to Dependents in 186 Cases,	$ 606,184,88
Average Compensation per Case,	$ 3,259 05
Average Number of Dependents per Case,	2.9
Gratuitous,	$ 5,978 33
Fatal Approvals,	187

REPORT OF THE INDUSTRIAL ACCIDENT BUREAU.

July 1, 1919, *to June* 30, 1920.

Although the law governing the reporting of industrial accidents provides for the reporting of those accidents only that result fatally or involve a disability of at least two weeks' duration, this Bureau in its endeavor to ascertain complete data on the risk hazards of industry has requested all employers and insurance companies to report every accident that involves loss of time in excess of the day, turn or shift on which it occurs. This Bureau therefore received during the year ending June 30,

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1920, reports of 28,841 tabulatable accidents, in addition to receiving approximately 30,000 reports of accidents showing only very slight injuries and resulting in no actual loss of time.

Of the total of 285 fatal and 28,556 non-fatal accidents reported as having occurred to workmen engaged in the four occupational groups into which the compilation is divided, 161 fatal and 14,100 non-fatal accidents are charged to factories and workshops, 31 fatal and 5,934 non-fatal to building and construction, 7 fatal and 224 non-fatal to mines and quarries and 86 fatal and 8,298 non-fatal cases to the miscellaneous group comprising principally accidents that occurred to employees engaged in public service employment.

There was a decided decrease in the number of fatal accidents as compared with the record of the preceding year. Factories and workshops show a decrease of 189, building and construction 26, mines and quarries 10 and the miscellaneous group 13, a total decrease of 239 less than the year 1919. Non-fatal accidents decreased 3,204 in factories and workshops, 1,150 in building and construction, but increased 19 in mines and quarries and 2,162 in the miscellaneous group, a net decrease of 2,172 for the year.

A general classification of the 140 distinct causes of factory and workshop accidents, concerning which the Department of Labor is especially interested, is given by absolute number and equivalent percentage in the following table.

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TABLE No. 1.

CAUSES OF FATAL AND NON-FATAL ACCIDENTS—FACTORIES AND WORKSHOPS, JULY 1, 1919 TO JUNE 30, 1920.

CAUSES.	FATAL.		NON-FATAL.	
	Number.	Per Cent.	Number.	Per Cent.
Power generators,	1	.62	19	.13
Transmission apparatus:				
Shafting,	3	1.86	7	.06
Belts and pulleys,	4	2.48	75	.53
Gearing,	1	.62	103	.73
Other transmission apparatus,	1	.62	12	.08
Power working machines,	10	6.21	2,831	20.08
Conveying and hoisting machinery:				
Elevators,	4	2.48	38	.27
Cranes,	14	8.70	205	1.45
Other conveying and hoisting machinery,	1	.62	19	.13
Explosions, hot substances, fire, etc.:				
Steam boilers, piping, etc.,	8	4.97	179	1.27
Powder, dynamite, etc.,	14	8.70	7	.06
Explosion and ignition of gases, dust, etc.,	2	1.24	24	.17
Hot substances, fire, chemicals, etc.,	5	3.11	531	3.77
Hot water, dyes, chemicals, etc., falls into,	9	5.60	145	1.03
Molten metal,	3	1.86	440	3.12
Contact with electric apparatus,	10	6.21	50	.35
Falls of persons,	29	18.00	1,006	7.13
Falling objects not being handled,	6	3.73	2,564	18.18
Handling objects,	1	.62	2,697	19.13
Hand tools,	..	....	284	2.01
Stepping on or striking against objects,	..	....	1,048	7.43
Flying objects from machines and tools,	6	3.73	928	6.58
Vehicles—run over or down by cars, trucks, etc.,	9	5.60	459	3.26
Industrial railway operation—steam and electric,	5	3.11	46	.33
Water transportation—falls from boats, docks, etc.,	1	.62	10	.07
Occupational diseases, fumes, etc.,	4	2.48	158	1.12
Infections and irritations,	7	4.35	90	.64
Miscellaneous,	3	1.86	125	.89
Total,	161	100.00	14,100	100.00

As shown by the above table only 39 or 24.22 per cent. of the fatal accidents and 3,309 or 23.47 per cent. of the non-fatal accidents were attributable to mechanical power, and of this number power working machines were responsible for 10 fatal and 2,831 non-fatal accidents. The above figures do not warrant the general inclination to associate mechanical causes almost exclusively with industrial hazards.

Falls of persons, with 29 fatalities, 9 of which were due to falls from ladders, scaffolds, etc., was the greatest single cause of fatal accidents, closely followed by cranes with a total of 14 and contact with electric apparatus 10; while power-working machines accountable for 2,831 or 20.08 per cent., handling objects with 2,697 or 19.13 per cent. and falling objects with a total of 2,564 or 18.18 per cent. were the causes of the greatest number of non-fatal accidents.

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TABLE No. 2.

CAUSES OF FATAL ACCIDENTS IN FACTORIES AND WORKSHOPS, BY INDUSTRIES, JULY 1, 1919, TO JUNE 30, 1920.

CAUSES.	STONE PRODUCTS.	CLAY PRODUCTS.	ROLLING MILLS AND WORKS.			METAL PRODUCTS.				MACHINERY AND INSTRUMENTS.			S. & R.	V.	LUMBER AND WOOD.		LEATHER	RUBBER GOODS AND COMPOSITION.		
	Cement and asbestos goods.	Brick, terra cotta, pottery.	Rolling and tube mills.	Steel making.	Wire.	Foundries.	Steel and iron (forging).	Sheet metal ware.	Hand tools.	Boilers and tanks.	Machinery (N.O.C.).	Machine shops (N.O.C.).	Smelting and refining.	Motor vehicle parts.	Wooden goods.	Shipbuilding.	Leather.	Rubber tires.	Rubber goods (hard and soft).	Celluloid and celluloid goods.
Power generators—																				
Steam engines,		1																		
Transmission—																				
Shafting,										1										
Shaft couplings and collars,	1																			
Belts and pulleys,									1		1								1	
Rope and chain drives,																				
Gearing-toothed and friction,																				
Working machinery—																				
Hydraulic presses,																				1
Calenders,																				
Wire stranding machines,					1															
Rolling machines (metal-working),			1																	
Rubber mill machinery,																	1			
Clay working machinery,		1																		
Bread mixing machinery,																				
Cleaning and oiling machinery in motion,					1															
Conveying and hoisting machinery:																				
Elevators—																				
Crushed between platform and floor,								1												
Caught between platform and gate,																				1
Objects falling down shaft, hit by,						1														
Cranes—																				
Falls from crane,							1													1
Struck by moving crane,							1						1			3				
Objects falling from cranes,											1					3				
Chain or hook broken,						1														
Hook or sling slipping,										1										
Caught in hoisting machinery,																				

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TABLE No. 2—Continued.

CAUSES OF FATAL ACCIDENTS IN FACTORIES AND WORKSHOPS, BY INDUSTRIES, JULY 1, 1919, TO JUNE 30, 1920.

CAUSES.	STONE PRODUCTS.	CLAY PRODUCTS.	ROLLING MILLS AND WORKS.			METAL PRODUCTS.				MACHINERY AND INSTRUMENTS.			S. & R.	V.	LUMBER AND WOOD.		THER LEA-	RUBBER GOODS AND COMPOSITION.		
	Cement and asbestos goods.	Brick, terra cotta, pottery.	Rolling and tube mills.	Steel making.	Wire.	Foundries.	Steel and iron (forging).	Sheet metal ware.	Hand tools.	Boilers and tanks.	Machinery (N.O.C.).	Machine shops (N.O.C.).	Smelting and refining.	Motor vehicle parts.	Wooden goods.	Shipbuilding.	Leather.	Rubber tires.	Rubber goods (hard and soft).	Celluloid and celluloid goods.
Explosions, hot substances, fire, etc.—																				
Steam boilers, steam piping, explosion, etc.,												1								
Inflammable, hot & corrosive materials, chemicals, etc.																			1	
Explosions of powder, dynamite, etc.,											1									
Explosion and ignition of gases, dust, etc.,																				1
Contact with electric apparatus, live wire, etc.,					1						1					1				1
Molten metal,						1							2							
Falls into oil tanks, water, dyes, chemicals, etc.,	1			1			1													
Falls of persons—																				
Falls from buildings,																	1			
Falls from scaffolds, ladders, etc.,						1	1									5				
Falls into excavations, etc.,						1														
Falls on level,							1							1						
Falls downstairs,																				
Falls through hatchways,																4				
Falls from chimneys, smokestacks, etc.,				1															1	
Falls of material—																				
Collapse and downfall of material,								2			1									
Collapse of scaffolds, ladders, etc.,																1				
Falls of material from buildings,																1				
Loading and unloading, objects dropped,																				
Vehicles, falls from, run over or down by,		1				1		1										1		
Railway operation, struck or run down by engine cars, etc.,		1														1			1	
Water transportation, falls from docks, bridges, etc.,																				
Flying objects from machines and tools,										1		1			2	1				
Asphyxiation and suffocation,				1												1				
Infection and irritations,				1												2				
Miscellaneous,																				
Totals,	2	4	1	4	3	6	5	4	1	3	5	2	3	1	2	23	2	1	4	5

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TABLE No. 2—Continued.

CAUSES OF FATAL ACCIDENTS IN FACTORIES AND WORKSHOPS, BY INDUSTRIES, JULY 1, 1919, TO JUNE 30, 1920.

CAUSES.	CHEMICALS.								PAPER AND PRODUCTS.		TEXTILES.		CLOTHING.	FOOD PRODUCTS.				MISCELLANEOUS.	
	Chemicals.	Powder.	Fertilizer.	Petroleum and Products.	Colors and dyes.	Paints and varnishes.	Asphalt and coal tar products.	Soap and vegetable oils.	Paper boxes.	Paper.	Silk (Broad and ribbon).	Textile dyeing and finishing.	Hats and caps.	Bakeries.	Sugar refining.	Slaughter and packing houses.	Confectionery and ice cream.	Miscellaneous.	Totals.
Power generators—																			
Steam engines,																			1
Transmission—																			
Shafting,	1																		2
Shaft couplings and collars,																			1
Belts and pulleys,										1									4
Rope and chain drives,			1																1
Gearing, toothed and friction,			1																1
Working machinery—																			
Hydraulic presses,																			1
Calenders,																	1		1
Wire stranding machines,																			1
Rolling machines (metal-working),																			1
Rubber mill machinery,																			1
Clay working machinery,																			1
Bread mixing machinery,														3					3
Cleaning and oiling machinery in motion,																			1
Conveying and hoisting machinery:																			
Elevators—																			
Crushed between platform and floor,													1						2
Caught between platform and gate,																			1
Objects falling down shaft, hit by,																			1
Cranes—																			
Falls from crane,															1				2
Struck by moving crane,																			5
Objects falling from cranes,																			4
Chain or hook broken,																			1
Hook or sling slipping,															1				2
Caught in hoisting machinery,															1				1

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TABLE No. 2—Concluded.

CAUSES OF FATAL ACCIDENTS IN FACTORIES AND WORKSHOPS, BY INDUSTRIES, JULY 1, 1919, TO JUNE 30, 1920.

CAUSES.	CHEMICALS.								PAPER AND PRODUCTS.		TEXTILES.		CLOTHING.	FOOD PRODUCTS.				MISCELLANEOUS.	
	Chemicals.	Powder.	Fertilizer.	Petroleum and products.	Colors and dyes.	Paints and varnishes.	Asphalt and coal tar products.	Soap and vegetable oils.	Paper boxes.	Paper.	Silk (Broad and ribbon).	Textile dyeing and finishing.	Hats and caps.	Bakeries.	Sugar refining.	Slaughter and packing houses.	Confectionery and ice cream.	Miscellaneous.	Totals.
Explosions, hot substances, fire, etc.—																			
Steam boilers, steam piping, explosion, etc.,	....	....	....	2	2	....	....	....	....	....	....	1	....	....	1	....	....	1	8
Inflammable, hot & Corrosive materials, chemicals, etc.	1	....	....	2	....	....	....	....	....	....	1	....	....	....	....	....	....	....	5
Explosions of powder, dynamite, etc.,	4	8	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	14
Explosion and ignition of gases, dust, etc.,	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2
Contact with electric apparatus, live wire, etc.,	....	....	....	....	2	1	....	1	....	....	....	....	....	....	1	....	1	....	10
Molten metal,	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3
Falls into oil tanks, water, dyes, chemicals, etc.,	....	....	....	....	....	....	....	....	1	....	....	2	....	....	1	1	....	1	9
Falls of persons—																			
Falls from buildings,	....	....	....	....	....	....	1	....	1	....	....	....	....	....	....	....	....	....	3
Falls from scaffolds, ladders, etc.,	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	9
Falls into excavations, etc.,	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Falls on level,	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2
Falls downstairs,	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	1
Falls through hatchways,	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	5
Falls from chimneys, smokestacks, etc.,	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2
Falls of material—																			
Collapse and downfall of material,	....	....	....	1	....	....	....	....	....	....	....	1	....	....	....	....	....	....	5
Collapse of scaffolds, ladders, etc.,	....	....	....	4	....	....	....	....	....	....	....	....	....	....	1	....	....	....	6
Falls of material from buildings,	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Loading and unloading, objects dropped,	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Vehicles, falls from, run over or run down by,	3	....	....	....	....	....	....	....	....	1	....	....	....	2	....	....	....	....	10
Railway operation, struck or run down by engine, cars, etc.,	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	4
Water transportation, falls from docks, bridges, etc.,	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	1
Flying objects from machines and tools,	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	6
Asphyxiation and suffocation,	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	4
Infection and irritations,	....	....	....	....	....	....	....	1	....	....	....	1	1	....	....	1	....	....	7
Miscellaneous,	....	....	....	1	....	....	....	....	1	....	1	....	....	....	....	....	....	....	3
Totals,	12	8	2	11	8	2	2	2	3	2	2	6	2	5	6	3	2	2	161

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TABLE NO. 3.
CLASSIFICATION OF FATAL AND NON-FATAL ACCIDENTS BY INDUSTRIES, JULY 1, 1919, TO JUNE 30, 1920.

INDUSTRIES	FATAL.		NON-FATAL.	
	Number	Per Cent.	Number	Per Cent.
Stone products,	2	1.24	84	.60
Clay products,	4	2.48	157	1.11
Glass products,	.....	.....	173	1.23
Rolling mills and works,	8	4.97	906	6.43
Metal products,	16	9.94	3,992	28.31
Machinery and instruments,	10	6.21	1,847	13.10
Smelting and refining,	3	1.86	106	.75
Motor vehicles, airplanes, etc.,	1	.62	386	2.74
Shipbuilding and woodworking,	25	15.53	2,792	19.80
Leather,	2	1.24	149	1.06
Rubber and composition goods,	10	6.21	437	3.10
Chemicals and products,	47	29.20	1,708	12.11
Paper and paper products,	5	3.11	81	.57
Printing and bookbinding,	.....	.....	65	.46
Textiles,	8	4.97	269	1.91
Clothing,	2	1.24	93	.66
Foods, etc.,	16	9.94	381	2.70
Miscellaneous,	2	1.24	474	3.36
Totals,	161	100.00	14,100	100.00

From the above table it will be seen that of the 161 fatal accidents in manufacturing industry, 47 or 29.20 per cent. occurred in chemicals and products, 25 or 15.53 per cent. in shipbuilding, 16 or 9.94 per cent. in both metal products and food products, and 10 each in machinery and instruments and rubber and composition goods; while of the total of 14,100 non-fatal accidents 3,992 or 28.31 occurred in metal products, 2,792 or 19.80 per cent. in shipbuilding and wood working, 1,847 or 13.10 per cent. in machinery and instruments and 1,708 or 12.11 per cent. in chemical products.

The most serious results of the non-fatal accidents were: loss of sight of either eye 13, loss of right arm 2, of left arm 2, right hand 6, left hand 3, leg 2, foot 2, one finger either hand 623, two or more fingers of a hand 148, fingers of both hands 2, toes 43; fractures of arm 378, hand 54, finger 486, thigh 26, both thighs or legs 13, leg 184, upper and lower extremities 15, foot 294, toes 278, ribs 320, skull 68, scalp torn from head 10 and hernias 280.

The following table shows the results of all accidents in factories and workshops by causes:

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TABLE NO. 4.
RESULTS OF ACCIDENTS BY CAUSES, FACTORIES AND WORKSHOPS, JULY 1, 1919, TO JUNE 30, 1920.

CAUSES.	Fatal.	NON-FATAL.			Total.
		Permanent Partial Disabilities.	Fractures.	Other Injuries.	
Power generators,	1	6	4	9	20
Transmission apparatus—					
Shafting,	3	1	3	3	10
Belts and pulleys,	4	8	34	33	79
Gearing,	1	23	6	74	104
Other transmission apparatus,	1	.....	1	11	13
Power working machines,	10	628	264	1939	2841
Conveying and hoisting machinery:					
Elevators—					
Falls from car,	.....	.....	.....	2	2
Dropping, broken cable,	.....	.....	2	3	5
Crushed between platform and floor,	2	2	7	5	16
Crushed between platform and gate,	1	2	3	4	10
Falls down shaft,	.....	.....	4	4	8
Objects falling down shaft, hit by,	1	.....	.....	.....	1
Cranes—					
Falls from,	2	.....	1	1	4
Struck by moving crane,	5	4	17	5	31
Objects falling from crane,	4	8	26	18	56
Chain or hook broken,	1	4	8	2	15
Sling or hook slipping,	2	2	10	16	30
Other conveying and hoisting machinery,	1	15	6	81	103
Explosions, hot substances, fire, etc.,	51	5	5	1366	1427
Falls of persons,	29	1	505	500	1035
Falling objects not being handled,	6	57	584	1923	2570
Handling objects,	1	45	227	2425	2698
Hand tools,	.....	5	49	230	284
Stepping on or striking against objects,	.....	1	143	904	1048
Flying objects from machines and tools,	6	6	53	869	934
Vehicles—run over or down by cars, trucks, etc.,	9	13	173	273	468
Industrial railway operation—steam and electric,	5	3	19	24	51
Water transportation—falls from boats, docks, etc.,	1	.....	1	9	11
Occupational diseases, fumes, etc.,	4	.....	.....	158	162
Infections and irritations,	7	3	.....	87	97
Miscellaneous,	3	4	18	103	128
Total,	161	846	2173	11081	14261

The following table shows the results of accidents in factories and workshops due to power working machines:

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TABLE NO. 5.

RESULTS OF FATAL AND NON-FATAL ACCIDENTS, FACTORIES AND WORKSHOPS, JULY 1, 1919, TO JUNE 30, 1920.—POWER WORKING MACHINES.

POWER-WORKING MACHINES.	Fatal.	NON-FATAL.													Total.
		LOSS OF											Fractures.	Other Injuries.	
		Right Arm.	Left Arm.	Right Hand.	Left Hand.	1 Finger Right Hand.	1 Finger Left Hand.	2 or More Fingers Right Hand.	2 or More Fingers Left Hand.	Loss of Fingers Both Hands.	Toes.	One Eye.			
Metal-working machinery—															
Lathes,	.....	.....	.....	.....	.....	5	6	.....	.....	.....	.....	.....	16	58	85
Drilling machines,	.....	.....	.....	.....	.....	6	8	.....	.....	.....	.....	.....	7	37	58
Milling machines,	.....	.....	.....	.....	.....	7	7	.....	.....	.....	.....	.....	3	44	61
Planing and shaping machines,	.....	.....	.....	.....	.....	12	11	3	1	.....	.....	.....	5	54	86
Circular and band saws,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	25	28
Stamping machines,	.....	.....	.....	.....	.....	12	19	5	.....	.....	.....	.....	12	87	135
Screw machines,	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	3	15	20
Punch presses,	.....	.....	.....	.....	.....	59	65	22	23	1	.....	.....	41	173	384
Hydraulic presses,	1	.....	.....	.....	.....	.....	3	3	.....	.....	.....	.....	3	5	15
Other presses and embossing machines,	.....	.....	.....	.....	.....	6	2	.....	2	.....	.....	.....	.....	14	24
Wire drawing machines,	.....	.....	.....	.....	.....	7	.....	.....	1	.....	.....	.....	4	24	36
Wire stranding machines,	1	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	13	15
Feed rolls,	.....	.....	.....	.....	.....	.....	3	.....	.....	.....	.....	.....	1	25	29
Shears,	.....	.....	.....	1	.....	3	11	6	2	.....	.....	.....	3	24	50
Power tools,	.....	.....	.....	.....	.....	1	6	1	.....	.....	.....	.....	17	49	74
Welding and heat cutting machines,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	10
Rolling machines,	1	.....	.....	1	.....	3	2	1	.....	.....	.....	.....	3	33	44
Riveting machines,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7	9	16
Other metal-working machinery,	.....	.....	.....	.....	.....	5	13	2	1	.....	.....	.....	1	31	53
Wood-working machinery—															
Drilling and milling machines,	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1	2
Planing and shaping machines,	.....	.....	.....	.....	.....	5	9	3	.....	.....	.....	.....	.....	31	48
Jointers,	.....	.....	.....	.....	.....	16	7	2	5	.....	.....	.....	.....	39	63
Circular saws,	.....	.....	.....	.....	.....	9	20	4	12	.....	.....	.....	7	69	121
Band saws,	.....	.....	.....	.....	.....	6	3	.....	.....	.....	.....	.....	.....	48	57
Textile machinery—															
Power looms,	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	11	24	36
Picking machines,	.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	1	2	5
Spinning machines,	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	9	10
Carding machines,	.....	.....	.....	.....	.....	4	.....	.....	.....	.....	.....	.....	1	2	7

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TABLE NO. 5—Continued.

RESULTS OF FATAL AND NON-FATAL ACCIDENTS, FACTORIES AND WORKSHOPS, JULY 1, 1919, TO JUNE 30, 1920.—POWER WORKING MACHINES.

POWER-WORKING MACHINES.	Fatal.	NON-FATAL.													Total.
		LOSS OF											Fractures.	Other Injuries.	
		Right Arm.	Left Arm.	Right Hand.	Left Hand.	1 Finger Right Hand.	1 Finger Left Hand.	2 or More Fingers Right Hand.	2 or More Fingers Left Hand.	Loss of Fingers Both Hands.	Toes.	One Eye.			
Textile machinery—Continued.															
Winding machines,	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	5	6	12
Knitting machines,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	11	12
Finishing machines,	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	2	3
Embroidery machines,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	10	11
Sewing machines,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	23	23
Cloth-cutting machines,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11	11
Textile machinery (N. O. C.),	.....	.....	.....	.....	.....	6	5	2	.....	.....	.....	.....	9	46	68
Paper and Printing Machinery—															
Calenders,	1	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	6	30	38
Paper cutting machines,	.....	.....	.....	.....	.....	.....	2	4	1	.....	.....	.....	2	3	12
Paper covering machines,	.....	.....	.....	.....	.....	.....	2	.....	1	.....	.....	.....	.....	7	10
Staying and ending machines,	.....	.....	.....	.....	.....	1	5	.....	2	.....	.....	.....	7	7	22
Printing presses,	.....	.....	.....	.....	.....	3	1	.....	1	.....	2	.....	12	15	34
Polishing machines—															
Emery wheels—bursting of,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	7	8
Emery wheels—contact with,	.....	.....	.....	.....	.....	5	10	.....	1	.....	.....	.....	14	61	91
Emery wheels—flying particles from,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	320	321
Other polishing and abrasive wheels,	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	24	25
Rubber Mill Machinery,	1	.....	1	1	1	7	9	3	1	.....	.....	.....	12	53	89
Leather-working machinery,	.....	.....	.....	1	.....	5	6	2	5	.....	.....	.....	8	48	75
Clay-working machinery,	1	.....	.....	.....	.....	2	1	1	.....	.....	.....	.....	2	11	18
Bread-mixing machines,	3	.....	.....	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	11	17
Laundry machinery,	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	1	15	17
Cleaning and oiling machinery in motion,	1	.....	.....	1	1	12	10	6	4	1	.....	.....	10	92	138
Cigar-rolling machines,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	32	38
Machinery (N.O.C.),	.....	.....	.....	.....	.....	9	9	.....	.....	.....	.....	.....	19	139	176
Total,	10	1	1	5	2	220	260	70	63	2	2	2	264	1,939	2,841

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TABLE No. 6.

RESULTS OF ACCIDENTS DUE TO FALLS OF PERSONS AND OBJECTS IN FACTORIES AND WORKSHOPS, JULY 1, 1919, TO JUNE 30, 1920, INCLUSIVE.

CAUSES.	Fatal.	NON-FATAL.								
		LOSS OF MEMBER.		FRACTURES OF					Other Injuries.	Total.
		Upper Extremities.	Lower Extremities.	Upper Extremities.	Lower Extremities.	Upper & Lower Extremities.	Trunk.	Head.		
Falls of persons—										
Falls on level,	2	.....	.....	73	39	3	37	4	135	293
Falls from buildings,	3	.....	.....	5	.....	1	1	.....	18	28
Falls from scaffolds, ladders, etc.,	9	.....	.....	48	56	6	63	20	216	418
Falls through collapse of scaffolds, ladders, etc.,	6	.....	.....	24	26	.....	18	.....	63	137
Falls from chimneys, stacks, etc.,	1	.....	.....	2	2	.....	1	1	3	10
Falls downstairs,	1	.....	.....	7	5	.....	19	1	20	53
Falls through hatchways,	6	.....	.....	6	.....	.....	1	5	4	22
Falls into excavations,	1	.....	1	4	10	.....	16	1	41	74
Falls of objects not being handled—										
Collapse and downfall of material,	5	22	9	112	230	4	58	23	1,365	1,828
Falls of material from buildings, scaffolds, etc.,	1	.....	.....	12	12	.....	4	17	155	201
Falls of material from machines and workbenches,	.....	14	12	32	68	.....	3	2	365	496
Objects dropped by other persons,	.....	.....	.....	3	.....	.....	.....	4	38	45
Handling objects—										
Loading and unloading—objects dropped,	1	41	3	64	153	1	4	1	870	1,138
Loading and unloading—strain in lifting,	.....	.....	.....	3	.....	.....	1	.....	476	480
Handling sharp objects,	.....	1	.....	.....	.....	.....	.....	.....	1,079	1,080
Totals,	36	78	25	395	601	15	226	79	4,848	6,303

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TABLE NO. 7.

RESULTS OF ACCIDENTS FROM EXPLOSIONS, HOT SUBSTANCES, FIRES, ETC., FACTORIES AND WORKSHOPS, JULY 1, 1919, TO JUNE 30, 1920.

CAUSES.	Fatal.	NON-FATAL.		Total.
		Burns and Scalds.	Other Injuries.	
Steam boilers, piping, etc., explosion of,	8	150	29	187
Hot substances, fire, chemicals, etc.,	5	504	27	536
Molten metal,	3	423	17	443
Contact with electric apparatus,	10	49	1	60
Powder, dynamite, chemicals, explosion of,	14	4	3	21
Gases, dust, etc., explosion and ignition of,	2	21	3	26
Hot water, dyes, chemicals, etc., falls into,	9	144	1	154
Other causes,	.....	162	.....	162
Total,	51	1,457	81	1,589

The 1,516 cases of infection following injury, including 7 fatal cases and 3 resulting in the loss of a finger, emphasize the necessity of having all injuries, no matter how apparently slight or trivial, reported and treated immediately.

TABLE NO. 8.

INFECTED INJURIES BY EXTENT OF DISABILITY, FACTORIES AND WORKSHOPS, JULY 1, 1919, TO JUNE 30, 1920.

CAUSES.	Fatal.	Permanent Partial Disabilities.	Temporary Disabilities.
Power-working machines,	.....	.....	19
Explosion, hot substances, fire, etc.,	.....	.....	67
Falls of persons,	.....	.....	3
Falling objects, not being handled,	.....	.....	90
Handling objects,	.....	.....	822
Hand tools,	.....	.....	87
Stepping on or striking against objects,	.....	.....	278
Flying objects from machines and tools,	.....	.....	87
Infections and irritations,	7	3	74
Miscellaneous causes,	.....	.....	29
Total,	7	3	1,506

1,166 or 8.27 per cent. of the non-fatal accidents in factories and workshops resulted, as shown in the following table, in injuries to the eyes.

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TABLE NO. 9.

EYE ACCIDENTS—FACTORIES AND WORKSHOPS, JULY 1, 1919, TO JUNE 30, 1920, INCLUSIVE.

CAUSES.	Loss of Either Eye.	BURNS AND SCALDS.		INFECTIONS.		Other Injuries to Either Eye.	Other Injuries to Both Eyes.	Total.
		Either Eye.	Both Eyes.	Either Eye.	Both Eyes.			
Bursting of emery wheel,	1	.....	.....	.....	.....	.....	.....	1
Flying objects from emery wheels, etc.,	1	2	.....	1	.....	274	38	376
Flying objects from machines and tools,	6	80	.....	54	.....	489	69	698
Inflammable, hot and corrosive materials, chemicals, etc.,	1	36	25	.....	.....	.....	.....	62
Molten metal,	3	38	12	1	.....	.....	.....	54
Hand tools in hands of injured person,	.....	.....	.....	.....	.....	3	.....	3
Electrical apparatus, etc.,	.....	2	5	.....	.....	1	.....	8
Welding and heat cutting machines,	.....	1	.....	.....	.....	2	.....	3
Collapse and downfall of material,	1	.....	.....	.....	.....	.....	.....	1
Striking against objects,	.....	.....	.....	.....	.....	2	.....	2
Miscellaneous causes,	.....	2	.....	2	3	1	10	18
Total,	13	161	42	58	3	772	117	1,166

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The causes of the fatal and non-fatal accidents in building and construction, mines and quarries and the miscellaneous groups are shown separately in the following tables:

TABLE NO. 10.

CAUSES OF FATAL AND NON-FATAL ACCIDENTS, BUILDING AND CONSTRUCTION, JULY 1, 1919, TO JUNE 30, 1920.

CAUSES.	Fatal.	Non-Fatal.	Total.
Power generators,	.....	4	4
Transmission apparatus,	.....	18	18
Power-working machinery,	.....	6	6
Conveying and hoisting machinery:			
Fall from crane,	.....	11	11
Struck by moving crane, derrick, etc.,	.....	14	14
Fall of material from derrick,	1	47	48
Other conveying and hoisting apparatus,	.....	35	35
Explosions, hot substances, etc.,	2	41	43
Contact with electric apparatus,	1	7	8
Falls of persons:			
From buildings,	3	189	192
From scaffolds, ladders, etc.,	5	352	357
Into excavations,	.....	63	63
Fall of material:			
Collapse and downall of material,	.....	2,297	2,297
Collapse of buildings and walls,	1	17	18
Collapse of scaffolds, ladders, etc.,	8	243	251
Collapse of excavations,	4	41	45
Hand tools,	.....	304	304
Handling objects,	.....	1,428	1,428
Striking against objects,	.....	406	406
Vehicles—falls from, run down by cars, trucks, etc.,	5	174	179
Miscellaneous causes,	1	237	238
Total,	31	5,934	5,965

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TABLE NO. 11.

CAUSES OF FATAL AND NON-FATAL ACCIDENTS IN MINES AND QUARRIES, JULY 1, 1919, TO JUNE 30, 1920.

CAUSES.	MINES.		QUARRIES.	
	Fatal.	Non-Fatal.	Fatal.	Non-Fatal.
Steam engines,	.....	.....	.....	2
Working machinery,	.....	2	.....	1
Conveying and hoisting machinery:				
Elevators and hoists,	.....	2	.....	2
Derricks, cranes, shovels, etc.,	.....	1	1	7
Conveying and hoisting machinery (N.O.C.),	.....	2	.....	5
Locomotives and cars,	1	8	1	12
Explosives:				
Powder and dynamite (except blasts),	.....	1	.....	.....
Blasts:				
Delayed or premature shots,	.....	6	.....	.....
Tamping,	.....	1	.....	1
Others (including flying objects),	.....	2	.....	19
Falling objects not dropped:				
Rocks, earth, etc.,	.....	24	1	17
Falling tools or objects dropped by other person,	.....	2	.....	6
Fall of objects being handled by injured person,	.....	15	.....	26
Objects used in construction or repair by persons injured,	.....	1	.....	9
Poisonous gases,	.....	.....	1	.....
Vehicles and animals,	.....	1	.....	2
Fall of persons:				
Into shafts, hoistways or openings,	.....	4	.....	5
Other or indefinite,	.....	.....	.....	6
Drowning,	.....	.....	2	.....
Hand tools,	.....	2	.....	11
Handling sharp objects,	.....	1	.....	1
Striking against objects,	.....	5	.....	8
Miscellaneous,	.....	3	.....	1
Total,	1	83	6	141

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TABLE No. 12.

CAUSES OF FATAL AND NON-FATAL ACCIDENTS, MISCELLANEOUS GROUP, JULY 1, 1919, TO JUNE 30, 1920.

CAUSES.	Fatal.	Non-Fatal.	Total.
Transmission apparatus,	3	3	6
Conveying and hoisting machinery:			
Elevators—Crushed between elevator and shaft,	1	4	5
Falls down shaft,	2	1	3
Hoists—Fall of material from hoists,	1	11	12
Steam boilers, piping, etc.,	.....	3	3
Explosion of dynamite, etc.,	1	2	3
Fire,	5	4	9
Hot and corrosive materials, chemicals, etc.,	.....	16	16
Contact with electric apparatus,	10	4	14
Fall of persons:			
From buildings,	.....	3	3
From scaffolds, ladders, etc.,	4	156	160
On level,	.....	479	479
Down stairs,	.....	21	21
Down hatchways,	.....	9	9
Into excavations,	2	33	35
Collapse and downfall of material,	2	924	926
Loading and unloading—objects dropped,	2	1,737	1,739
Handling sharp objects,	.....	714	714
Striking against objects,	1	583	584
Vehicles—run over or down by cars, trucks, etc.,	19	1,975	1,994
Railway operation—run over or struck by engine, cars, etc.,	22	953	975
Drowning,	4	.....	4
Suffocation and fumes,	1	14	15
Infection,	3	149	152
Animals,	2	12	14
Other causes,	2	488	490
Total,	86	8,298	8,384

TABLE NO. 13.

NUMBER AND PER CENT. OF FATAL AND NON-FATAL ACCIDENTS BY OCCUPATIONAL GROUPS, JULY 1, 1919, TO JUNE 30, 1920.

	FATAL.		NON-FATAL.		TOTAL.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
Factories and workshops,	161	56.49	14,100	49.38	14,261	49.45
Building and construction,	31	10.88	5,934	20.78	5,965	20.68
Mines and quarries,	7	2.46	224	.78	231	.80
Miscellaneous,	86	30.17	8,298	29.06	8,384	29.07
Total,	285	100.00	28,556	100.00	28,841	100.00

Since its organization, the Industrial Accident Bureau has issued monthly bulletins, in which the accidents of the previous month are analyzed as to their causes, results and the industries in which they occurred, thus becoming interesting and valuable source of information to our safety engineers, factory inspectors

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and the members of the Rehabilitation Commission in their study of the risk hazards of industry and of the economic consequences of permanent injuries suffered by the industrial workers of the State.

BUREAU OF INDUSTRIAL STATISTICS.

Division of Industrial Information.
State Industrial Safety Museum.

The Department of Labor has long felt the need for facilities for a practical demonstration of the economic value of its work of industrial conservation. The trend of modern industry is toward the elimination of all needless wastes, either in the overhead of equipment or in the handling of material and men. While the Department's Bureaus of Structural Engineering, Electrical and Mechanical Equipment, Hygiene and Sanitation, Steam Engineers' License, Industrial Statistics, and Workmen's Compensation, have been co-operating with the employers of the State, it has nevertheless been evident that their value will be greatly enhanced by the existence of some Clearing House equipped with physical exhibits available for demonstration purposes.

FUNCTION OF THE MUSEUM.

A recent act of the Legislature has authorized the establishment of a State Industrial Safety Museum, under the jurisdiction of the Department of Labor, to further the standardization of safety and economic stability in the industries of New Jersey. By the provisions of the measure the Museum is required to serve as an official Clearing House to co-ordinate the conservation activities of the Department of Labor, of the Compensation, Accident, Fire and Life Insurance Companies, and of the Public Service and Railroad Carriers operating in the State.

While primarily concerned with the lessening of industrial injuries, the Museum will also cover the field of public and home accidents, and of community fire hazards.

Because of needless expenditure and annoyance arising from the existence of conflicting safety regulations among Insurance

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Carriers, Rating Boards, and the Bureaus of the Department, the Museum is called upon to establish uniform standards and practices among all agencies which are concerned with the reduction of physical and property waste in New Jersey.

Hereafter all orders involving technical advice covering working conditions, accident and fire hazards, issued by the Bureaus of Structural Engineering, Electrical and Mechanical Equipment, Hygiene and Sanitation, Engineers' Licenses, Mines and Quarries and High Explosives will be discussed at the Museum by representatives of firms served with notices, and the Department's Engineers. This will provide 8,500 New Jersey employers with facilities for investigating the most economical and practical methods for the reduction of accidents and the stabilizing of the labor force now operative in the plants of their competitors. The Commissioner of Labor will also hold special conferences by appointment at the Museum.

Exhibits valued at over $150,000, including live machinery, fire fighting apparatus, electrical equipment and lighting systems, welfare provisions, safety devices, blue prints, photographs, engineering data, reports and statistical charts are now being prepared and installed under the direction of experts in the building leased by the Department of Labor at 571 Jersey Avenue, Jersey City. The ample floor space in this edifice, recently remodeled by the Jersey City Commission, combined with its solid construction of brick and steel, makes the new Museum a notable addition to the official administrative equipment of the State.

Other activities include the holding of Workmen's Compensation hearings in quarters set aside for the purpose; and the daily presence at the Museum of a Deputy Commissioner, to give advice to employers and workers on questions involving Workmen's Compensation.

A rehabilitation Clinic will be installed provided with special equipment for the orthopedic treatment of injured citizens. A registered nurse will be continually in attendance, and a surgeon on specified days.

A Public Employment Office, operating without charge to employer or worker, will be conducted on the premises.

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MACHINE EXHIBITS.

Sixty feet of line shafting and individual motor-drive will give facilities for demonstrating the necessity for approved types of standard safeguards. Valuable exhibits, including wood working machines, punch presses, a rubber calender, and transmission-machinery installations, will be supplemented by files covering every variety of power driven productive equipment now operative in the State.

An office has been provided for consultation purposes, which is at the service of representatives of all co-operating conservation organizations.

ELECTRICAL EQUIPMENT.

The latest developments in the arts of lighting, electrical safety-control and electrical fire alarm systems, in both physical exhibits and chart and diagrammatic form will be shown. This includes night watch and fire alarm systems both directly and indirectly connected with the city fire department; purely local and interior fire alarm systems intended to supplement factory fire drills; safety control switches and allied equipment; and lighting throughout the entire floor as a physical demonstration of the desirability of modern practice in lighting factory areas.

STRUCTURAL.

A comprehensive chart and photographic display will be shown of up-to-date factory buildings erected in New Jersey under the State code, in compliance with the State laws.

There will be an elaborate display of elevator construction, showing all the working parts of an elevator conforming with the State laws; such as elevator machinery and car and shaft protection, including different types of automatic or semi-automatic fireproof doors, and a number of interlocking devices approved by the State Department of Labor.

Different types of handrails to be used on interior stairs will be exhibited, together with a section of standard stair construc-

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tion, as well as sections of standard stair enclosure, and photographs showing general alterations to factory buildings. A full-sized workable display of scaffolding equipment, outlining all practical safety features, will include a display of different types of safety ladders and scaffolding.

A valuable collection of photographs, charts and layouts for practical housing methods in connection with manufacturing plants will be available for the employers of the State.

The display of structural features arranged by the Bureau of Structural and Fire Protection Inspection will benefit prospective builders of manufacturing plants, as well as those contemplating making changes in their present buildings. The Bureau is in touch with the leading architects of the different States, and is ready at all times to furnish information regarding proper factory construction and alterations, and the Engineer will arrange to go over any preliminary plans at the Museum of Safety before final plans have been drawn.

This Bureau also has under its supervision the manufacturing, handling and transporting of explosives, and the activities of the State of New Jersey will be demonstrated in connection with the Explosive work.

INDUSTRIAL RELATIONS.

The stabilizing of the labor turnover by means of betterment provisions, improved employment methods, co-ordination of the personnel activities, and approved types of safety shop committees will be covered by exhibits of charts and photographs in a special room reserved for the purpose.

Group insurance, industrial housing and community and plant hygiene for the reduction of tuberculosis will also be included.

LIGHTING EXHIBITS, DEMONSTRATION AND LECTURE PROGRAM.

The Industrial Lighting exhibits throughout the building demonstrate the practical application of the best scientific thought upon this subject. They illustrate the most satisfactory and economical methods of providing approved standards of artificial

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lighting at once free from objectionable shadows and disadvantageous glare. Comparison will be made between the auxiliary reflecting-service of properly finished wall and ceiling surfaces, and the contrasting conditions commonly found in industry. This will serve to demonstrate the possibility of an increased efficiency in lighting systems almost beyond the imagination of those not directly associated with this line of investigation.

These exhibits are not limited to the products of any single manufacturer, but rather represent the entire range of Illuminating Engineering and the best practices. One section is devoted to methods of showing the relationship of poor lighting to industry, contrasted with adequate lighting, in accordance with the standards issued by the Electrical Bureau of the Department of Labor. Physical exhibits, charts, engineering data, and photographic displays dealing with every phase of industrial lighting will be found, in such form as to be readily available for the use of all those interested.

By means of window shades the intensity of natural lighting in the rooms of the Museum can be matched to that of any industrial work-room or bay under discussion, and the amount of necessary auxiliary artificial lighting determined. Or the rooms can be completely darkened for tests of night-shift requirements, and by aid of a photometer, the exact foot-candle standards required by the Lighting Code ascertained.

Since each lighting system is controlled by a dial switch, with dimmer attachment, conclusive tests of special installations are possible The entire range has been covered of types adapted for the foundry, the textile mill, and the machine shop, as well as for the office and the draughting room.

In addition, the latest improvements in high intensity gas illumination have been incorporated in the Museum's lighting exhibit, which—including an installation of the mercury vapor lamp—is now one of the most comprehensive in the country.

It is an established fact that sub-standard plant-lighting bears a definite relation not only to industrial accident but also to decreased production. It is this phase of the question, as well as the duty of safeguarding the workers against eyestrain, which

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has led the Department to adopt an educational program that includes sectional lectures with physical demonstrations on both the economic and safety value of the best lighting practices.

ENGINEERS' LICENSE, STEAM BOILER AND REFRIGERATING PLANT INSPECTION BUREAU.

An exhibit of standard appliances approved in the State and in use throughout the country has been prepared under the supervision of the Engineers' License and Steam Boiler Inspection Bureau. This will include a model of an accepted type of a fire and water tube boiler erected with permissible fittings, piping, gauges and safety appliances, also cross-connected for unit operation as approved by the N. J. Board of Boiler Rules; portable and steam heating boilers of various types, water gauges, governors, high pressure steam valves, triple duty non-return valves, blow off valves, improved stop motions on engine governors, reducing valves, injectors, inspirators, steam feed and force feed lubricators; also examples of damaged boiler plate and ruptured joints caused by corrosion, scale, uneven contraction, expansion, etc., which will demonstrate the effect of water and gases on boilers while in operation principally, and which would indicate improper treatment or various causes which create these conditions. New and improved designs will be an additional feature of this exhibit from time to time. Conspicuously displayed will be blue prints, detailed specifications, etc., covering various designs which will serve as first hand information to anyone contemplating installations; also complete refrigerating apparatus showing proper safety appliances, gas masks, first-aid cabinets and their proper location with instructions in emergency cases.

WELFARE EXHIBITS: HYGIENE AND SANITATION.

Now that safeguarding the health of the employee is recognized as of prime importance to our manufacturing interests, the question of the best practices and essentials of factory hygiene

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has claimed the attention of a wide variety of employers. While no two plants have identical physical-efficiency problems, certain groups of industries are allied in their common-health-hazards arising from dangerous materials handled, or from the presence in the workrooms of dust, fumes, steam, and excessive heat.

A special section of the Museum is devoted to exhibiting standard toilet, dressing room, wash room and shower installations adapted to various types of employment ranging from the machine shop to the smelter. Lunch room equipment will be shown by means of photographs and blue prints covering the simplest coffee-stand and club room lunch-box service up to the elaborate cafeteria. An emergency first-aid station and a complete industrial hospital room ranging from $100.00 to $2,500.00 in price, together with photographs embracing fifteen different "First Aid" layouts, will be shown; also a dental clinic unit, and equipment illustrating approved methods of physical examination. Postural defect data, fatigue charts, exhibits of bulletins devoted to preventive industrial hygiene and the co-operative services of the Anti-Tuberculosis League, as well as photographs of industrial and community health hazards, will furnish unique facilities to employers for corrective reduction of lost time and lowered physique, due to non-industrial injury.

Detailed engineering data and photographs of practical installations will cover all problems of mechanical ventilation connected with the fan removal of industrial dusts, fumes, steam and excessive heat. Model exhaust systems connected to woodworking machines on the fourth floor and the grinding, buffing and polishing lathes in the foundry exhibit on the first floor will illustrate the Department's standards as to fan power, pipe sizes, and structural requirements.

BUREAU OF MINES.

A portion of floor space has been allotted to the Bureau of Mines for the purpose of presenting an exhibition of the safety equipment required by the mining laws of New Jersey.

The Bureau of Mines will have a working model of a mine showing the several shafts entering the mine, drifts, stopes, and

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all of the underground workings possible to get into such an exhibit.

The safety equipment will include standard method of constructing ladderways, safeguarding shaft entrances; signals; hoisting machinery provided with automatic stops; safety helmets that may be used in case of fires; diagrams illustrating the several methods used in mining ores; sanitary equipment; and medical supplies required by a First Aid unit.

FOUNDRY EXHIBIT.

Some $20,000 worth of exhibits will be installed, including the best types of sand blast rooms and cabinets, core ovens, tumbling barrels, buffing, grinding and polishing lathes, and a wide range of practical foundry equipment. Lighting, ventilation, heating, and standard foundry construction will be covered by means of photographs and blue prints.

FIRE PROTECTION.

The Bureau of Structural and Fire Protective Inspection has prepared a comprehensive display of fire prevention requirements, such as fire-fighting apparatus, chemical engines, fire extinguishers, fire hose, stand pipes, hooks and axes, and up-to-date sprinkling systems for manufacturing plants. Different types of sprinkler heads will be exhibited, and practical demonstration made by setting off sprinkling heads by different degrees of heat.

Methods of fireproof and fire-retarding enclosures for stairs and elevators will be shown, together with fireproof doors and windows for general construction, and fireproof doors and windows necessary in connection with fire escapes; also exhibits of fireproof and fire-retarding partitions with doors controlled by different types of closing devices. Panic bolts used for the opening of exit doors will be displayed and the different metal sashes used in factory construction as well as varieties of wire glass.

An elaborate display of photographs has been prepared of standard fire escapes erected throughout the State on manufacturing plants; together with charts showing the New Jersey

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standard fire escape and fireproofing construction. Safety cans, boxes and metal lined bins for the storage of oils, paints, oily waste and refuse will be exhibited; and devices having the Board of Fire Underwriters approval.

The above devices recommended for manufacturing plants have all been carefully examined and pronounced practical by either the Department of Labor or the National Board of Fire Underwriters. Hereafter manufacturers who have violations in their plants will visit the Museum to ascertain what equipment they should install to make their buildings comply with the law. This will enable them to receive competitive bids from the different concerns manufacturing fire protective equipment, as in all cases where equipment is exhibited, a list of several manufacturers will be displayed.

SAFETY LOCAL LECTURES.

While the Museum in Jersey City will serve as a Clearing House of Industrial Standards, the Department of Labor's active campaign for the reduction of physical and property losses in the State will be carried on by means of a lecture service in our leading manufacturing centers.

In co-operation with the State and local chambers of commerce, the Public Service, National Board of Fire Underwriters, insurance carriers, as well as police and fire departments, and Boards of Education, weekly and bi-monthly industrial round table meetings will be held for the benefit of managers, superintendents and foremen; supplemented by popular lectures on public accident and community health hazards and fire prevention, as well as safety talks in the public and parochial schools. The Factory Chief movement inaugurated by the Commissioner of Labor some years ago will be broadened to include all factors of safety and hygiene in plant administration; and by means of moving pictures. traveling exhibits, and bulletin boards a State-wide conservation campaign will be organized throughout New Jersey.

INDUSTRIAL LIBRARY SERVICE.

Under the auspices of the State Library Bureau the Museum will be equipped with a complete technical and shop library ser-

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vice, especially serviceable to plant managers, engineers and foremen. This will serve as a practical means of keeping in touch with the best current industrial publications, and co-ordinate State facilities for research and scientific production-standardization, now scattered through our various technical libraries.

SAFETY SCHOOL FOR CHAUFFEURS.

In the interest of public safety and the reduction of repair costs to manufacturers employing auto trucks service, safety schools for licensed chauffeurs will be opened under the auspices of the Museum. Competent instructors will give several weeks of practical training in the repair and upkeep of standard cars, supplemented by a week of road work. Diplomas will be issued.

REPORT OF EMPLOYMENT SERVICE.

During the past fiscal year the support of the Federal Government was very largely withdrawn, and for some months we have received substantially only the salaries of two assistants in the department. Owing to this fact, together with the comparatively small amount available from the State, it was necessary to discontinue the activities of several of the offices. The situation was materially assisted by the very generous co-operation and the financial assistance of the cities of Newark, Jersey City, Perth Amboy and Camden. The help of these cities made it possible to continue the Employment Offices in these several municipalities. In the city of Camden, the larger employing interests made contributions sufficient to pay the clerical assistants for several months. In the City of Atlantic City, the local Chamber of Commerce has practically financed the office beginning January 1, 1920, and the co-operative operation which has been conducted through the agency of the Committee of Three, appointed by the Chamber of Commerce, and the State Department of Labor, has been most satisfactory. It is hoped that this same co-operative arrangement may be made effective between other local business organizations throughout the State.

The period covered by the past fiscal year has been a difficult one from an employment standpoint, for during nearly the en-

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tire time there has been great industrial activity which offered an excellent field for a complete and efficient Employment Service. When workers were released in quantities from some lines, the demand was still strong enough for them to be absorbed by other industries. The reduction to the minimum of the time lost in the accomplishment of industrial readjustment should be the goal of a properly conducted service.

A surprisingly large number of applications have been received from discharged service men—17,441 in all—of which 13,883 have been placed in positions. This figure approximates that of the same period immediately preceding July 1, 1919, and includes many men discharged after service enlistments for the standard periods, as well as some previously discharged men who experienced difficulty in promptly locating their desired niche in industry. The volunteer Soldier and Sailor Bureaus have been of great assistance, but are now practically disbanded, permanent agencies having the situation well in hand.

There have been 4,056 farm hands placed at work and their transportation arranged to jobs in the agricultural districts.

Immigration has started again with an influx of workers. In the ordinary course of events, these people, many from lands and families of agricultural pursuits, will be absorbed by the large private interests away from the Atlantic Coast, who in the past have met the immigrants at the ports of entry. The problem of securing some of the desirable immigrants to the State of New Jersey is receiving attention by the department, and permission has been given by the Immigration authorities to station an agent of this State at Ellis Island and the port of entry at the city of Gloucester for the purpose "of presenting the special inducements offered by this State to aliens to settle therein." This will be carried through if the necessary funds can be obtained. It is hoped that through this method desirable labor may be secured for the farms and other interests requiring this type of help.

The Department of Labor is effecting plans under which the work of the Compensation administration, the activities of the Rehabilitation Commission, and the Employment Service, shall be so co-ordinated as to supplement the activities of each other.

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It is the plan to create in each industrial community a center where all the work connected with the industrial life may be promoted, and provide the machinery for, first, placing the worker in the best possible physical condition, second, furnishing him with the compensation contemplated under the law, and third, obtaining for him as good a position as his capabilities will permit. These centers should become the local clearing house for labor, and each worker out of employment should at once file his application, so this information would be available to the employers desirous of securing workers. There can be no doubt but that this plan, properly administered and receiving the support and co-operation of the employers of the community, would make for the benefit of the employer, the worker, and the community at large, for any plan which will cause an additional day's work will add to the prosperity of all three. It would certainly be far preferable to the present practice of "Hiring at the gates" or "Attracting workers through glowing advertisements." Now that the country is becoming well under way in the problem of re-adjustment, every thoughtful consideration should be given to the methods which are calculated to promote a friendly feeling between capital and labor, and a method which gives promise to the reduction of the labor turnover should be encouraged.

The following schedule of the activities of the Department during the year indicates its wide field of usefulness, and illustrates the necessity of providing adequate facilities to administer the work along efficient lines. The indicated placements are, of necessity, approximate, for the reason that during portions of the period the offices were financed, and, at times, operated by local organizations.

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Report of Placements and Activities by Offices.

1919–1920.

Office.	*Closed.*	*Placements.*
Asbury Park,	November 15, 1919, (Complete),	8,037
Atlantic City,	November 8 to January 5, 1920. Taken over by Chamber of Commerce, January 5, 1920,	5,521
Bayonne,	Taken over July 3, 1919, by War Camp Community Service; then Chamber of Commerce; later by Red Cross; now operated by the latter, (Complete),	1,905
Camden,	Operated on contributions from local manufacturers for past two months or more, (Complete),	15,740
Dover,	July 14, 1919. Opened again July 28, 1919, expenses to be paid by city for five months. Closed December 30, 1919,	1,469
Elizabeth,	Operated by city from July 18, 1919,	10,436
Jersey City,	(Partly estimated),	19,143
Newark,		69,985
New Brunswick,	February 26, 1920. Operated by city from August 1, 1919, to September 30, 1919; thereafter until closed by War Camp Community Service,	5,047
Orange,	February 28, 1920. State paid one-half expense and W. C. C. S. one-half for August, September, October, 1919. W. C. C. S. paid all expense November and December, 1919; State paid all January to February 28, 1920,	9,649
Passaic,	July 12, 1919,	1,113
Paterson,		58,478
Perth Amboy,	Operated by city from April 1, 1920,	4,518
Phillipsburg,	November 7, 1919, (Complete),	570
Trenton,	April 1, 1919, (Partly estimated),	8,076
		219,677

LICENSING OF PRIVATE EMPLOYMENT AGENCIES.

The report of the activities of the Department in the regulation of Private Employment Agencies for the past fiscal year indicates that the domestic help agencies are fewer in numbers and are gradually losing patronage, as the women and girls are leaving domestic service for factory and office work.

Increase has been made in the number of agencies handling skilled and unskilled male labor in quantity and for distance shipments, and of those agencies handling office and technical

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help. There are now but twelve of the latter licensed. Business at the seashore resorts has been reported as very good for the past two years, and agencies are increasing at these places.

The supervision of the Department has developed the necessity of institution of four prosecutions for the operation of agencies without a license, and two for charging registration fees. Each prosecution resulted in the conviction of the person sued, and one person was prosecuted twice for operating without a license.

From Jan. 1, to Dec. 1, 1919, the calendar year, 87 licenses were issued in 28 cities. License fees of $3,810.00 were collected.

From Jan. 1, to June 30, 1920, 88 licenses were issued in 27 cities.

From July 1, 1919, to June 30, 1920, 183 visits were made to agencies for inspection and investigation, and numerous complaints were handled and adjusted.

CHILD LABOR DIVISION.

Annual Report, Fiscal Year, July 1, 1919, to June 30, 1920.

The monthly reports compiled by the Child Labor Bureau show that during the fiscal year just completed, a total of 19,639 age and schooling certificates were issued, for which proofs were sent to this office, and approved, as provided by law:

		SEX.		AGE LAST BIRTHDAY.		
Month.	*Proofs.*	*M.*	*F.*	*14*	*15*	*16*
July, 1919,	2,987	1,540	1,447	2,221	690	76
August,	1,147	592	555	869	264	14
September,	1,506	777	729	1,033	448	25
October,	1,395	699	696	941	443	11
November,	1,290	668	622	891	363	36
December,	847	446	401	566	267	14
January, 1920,	1,400	657	743	939	418	43
February,	818	413	405	574	231	13
March,	1,944	1,013	931	1,543	547	54
April,	1,057	621	436	684	340	33
May,	2,923	1,637	1,286	1,938	917	67
June,	2,325	1,350	975	1,553	698	74
		10,413	9,226	13,552	5,627	460
		9,226		5,627		
				460		
Totals,	19,639	19,639		19,639		

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Comparison of the proofs received at this office for the last three years show that in the fiscal year 1917-1918, 19,024 sets of proofs were received; fiscal year 1918-1919, 20,081; fiscal year, 1919-1920, as already set forth, 19,639; so that the figures, while they indicate a slight decrease over the number received last year, and an increase of about 600 proofs over the number received during 1917-1918, demonstrate the fact that approximately 20,000 children leave school yearly and begin working, the majority of these going into the manufacturing and mercantile establishments.

During the period July 1, 1919, to June 30, 1920, our records show that this Department ordered the discharge of 246 children working in manufacturing establishments, where the employment was not in accordance with the requirements of the law.

45	discharges	were	ordered	in	July, 1919.
14	"	"	"	"	August.
28	"	"	"	"	September.
5	"	"	"	"	October.
24	"	"	"	"	November.
26	"	"	"	"	December.
14	"	"	"	"	January, 1920.
13	"	"	"	"	February.
17	"	"	"	"	March.
32	"	"	"	"	April.
13	"	"	"	"	May.
15	"	"	"	"	June.
Total, ... 246					

Of these, twenty-four were under fourteen years of age; in the balance of the cases, the reason for discharge was that no age and schooling certificate was filed, or that the work hours were in excess of the time allowed by law for children under sixteen years of age, or both; and in some few cases, children were ordered discharged who were employed on or in proximity to dangerous or hazardous machinery, etc. In mercantile establishments 65 discharges were ordered during the year, 19 children under fourteen years, and the balance because age and

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schooling certificates were not filed, or hours not in accordance with the requirements of the law.

While we find that manufacturers and merchants employing children show an evident desire to co-operate by carrying out orders received from this Department, there is still a class from whom we cannot expect compliance unless the full rigor of the law is brought to bear. For this reason we regret that the amendment to the present child labor laws, introduced during the last Legislature, which passed both houses, was vetoed, as it would have insured the collection of the full penalty specified from violators of these laws, which we firmly believe would be of great assistance to us in the enforcement of the statutes.

We are indebted to a number of charitable institutions and organizations in the State, for information concerning violation of the child labor laws, our investigation of the conditions reported having led to their correction. We are very thankful to all who, through their interest in children in industry have helped us to bring about compliance with the laws. The zealous work of the Inspectors in this Department, especially those whose work is more intimately connected with child labor matters, must not be lost sight of, and any improvement in conditions shown is due to the vigilance and watchfulness of these Inspectors, whose assistance to the office in this respect is invaluable. With the amendment in the law which is most hopefully expected by them, we trust that New Jersey will be in a position to state that child labor as a considerable problem will have ceased to exist.

NEGRO WELFARE BUREAU.

The Negro Welfare Bureau has been without special appropriation, and the work performed by it has been confined to such voluntary co-operation as has been secured by the Chief of the Bureau, together with the special work done by the Employment Service for the benefit of the colored race.

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PERSONNEL OF THE DEPARTMENT OF LABOR.

Lewis T. Bryant, Commissioner of Labor.
John I. Holt, Assistant Commissioner of Labor.

BUREAUS OF STRUCTURAL INSPECTION, EXPLOSIVES AND ASSIGNMENT OF INSPECTORS.

Charles H. Weeks, Chief.
Agnes V. Fitzpatrick, Stenographer.
Dorothy Maley, Stenographer.

BUREAU OF ELECTRICAL AND MECHANICAL EQUIPMENT.

Rowland H. Leveridge, Chief.
Charlotte T. Goodenough, Stenographer.
Madeline Gabel, Stenographer.

BUREAUS OF HYGIENE AND SANITATION, BAKERIES AND MINES.

John Roach, Chief.
Helen L. Long, Stenographer.
Margaret I. Cantwell, Stenographer.

WORKMEN'S COMPENSATION BUREAU.

William E. Stubbs, Deputy Commissioner of Compensation and Secretary.
George J. Jaeger, Deputy Commissioner of Compensation.
Harry J. Goas, Deputy Commissioner of Compensation.
James O. Boyd, Deputy Commissioner of Compensation.
Charles E. Corbin, Referee, Compensation Bureau.
Maurice S. Avidan, M.D., Medical Adviser.
Adolph Flachs, M.D., Medical Adviser.
Alexander S. Ross, M.D., Medical Adviser.
Edwin J. O'Brien, Court Stenographer.
John W. Kent, Investigator.
Harry W. Dean, Investigator.
John J. Stahl, Investigator.
Ethel M. Mullen, Chief Clerk.
Elizabeth Ashton, Compensation Settlement Clerk.
Emma Cline, Compensation Settlement Clerk.
Margaret Kafes, Compensation Settlement Clerk.
Helen Malloy, Compensation Settlement Clerk.
Ida P. Holstead, Stenographer.
Irene Kreis, Stenographer.
Mary D. Maestri, Stenographer.
Hattie B Gladney, Stenographer.
Amelia S. Cranmer, Stenographer.
Anna Laskowitz, Stenographer.
Helen Bodenweiser, Office Assistant.

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BUREAU OF INDUSTRIAL STATISTICS.

Lillian Erskine, Chief.
James A. T. Gribbin, Statistician.
Elizabeth Kulp, Stenographer and Office Assistant.

BUREAU OF NEGRO WELFARE.

Isaac Nutter, Chief.

ENGINEERS' LICENSE, STEAM BOILER AND REFRIGERATING PLANT INSPECTION BUREAU.

JOSEPH F. SCOTT, CHIEF.

Edward Walker, Examiner.
John W. Price, Examiner.
Cora M. Morrison, Bookkeeper.
Elizabeth A. Kervin, Correspondent and Inspection Clerk.
Miriam F. Scudder, Stenographer.
Lina Di Luigi, Office Assistant.
Ethel V. Updyke, Office Assistant.
Gertrude M. Maher, Office Assistant.

GENERAL ADMINISTRATION STAFF.

Mary M. McGowan, Child Labor Bureau.
Mary E. Banchoff, Stenographer.
Hannah F. Jones, Order Clerk.
Elizabeth R. Doherty, Bookkeeper.
Marion A. Green, Office Assistant.
Ruth I. Bowlby, Telephone Clerk and Office Assistant.
Mildred H. Wells, Record Clerk.
Ralph K. Dailey, Clerk.
Charles Scullin, Distributor.

FACTORY INSPECTORS.

Edna M. Allen, Special Inspector.
Augustus Munson, Mine Inspector.
Patrick J. Hayes, Bakery Inspector.
Crowell M. Haslett, Electrical Inspector.
George J. Speidel, Blower Inspector.
W. J. E. Seder.
William Baird.
William Crowley.
Henry Kuehnle.
Henry Klussmann.
Laura W. Moore.
James H. Tallon.
Fred P. Rearwin.

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William Van Assen.
John P. Diviny.
Lydia E. Sayer.
William Schlachter.
Nellie H. Slayback.
James Stanton.
Henry J. Lohse.
Henry Booth.

FEDERAL-STATE-MUNICIPAL EMPLOYMENT SERVICE.

RUSSELL J. ELDRIDGE, ACTING DIRECTOR.

Newark—
Leslie J. Allen, Sr., Examiner.
Lucretia E. Briden, Jr., Examiner.
George Allen, Examiner.
Alice Scott, Examiner.

Jersey City—
Rose Galaida, Examiner.
William Loss, Special Agent.
Helen J. Forbes, Stenographer.
Patrick Burns, Janitor.

Paterson—
James C. Matthews, Sr., Examiner.
Phœbe A. White, Special Agent.
John A. Huggs, Jr., Examiner.

Camden—
Leaman D. Johnson, Sr., Examiner.
Maude W. Moore, Jr., Examiner.

Atlantic City—
Mabel H. Brown, Placement Clerk.

Elizabeth—
Arthur L. Steele, Examiner.

REPORT OF THE MAILING DIVISION OF THE DEPARTMENT OF LABOR.

July 1, 1919, to June 30, 1920.

The Mailing Division of the Department has mailed during the past year 135,373 letters, 4,814 Parcel Post packages, 18,240 packages of printed matter, and 67 parcels of express matter, which has resulted in a total expenditure of postage amounting to $4,506.56; while an expenditure of $85.00 has

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been made for express and freight charges. The following is a tabulation, by months, of these expenditures:

Month	*Letters.*	*Printed Matter.*	*Parcel Post.*	*Express.*	*Postage.*
July,	11,226	825	337	13	$321 92
August,	7,774	538	150	8	218 61
September,	9,203	1,882	1,974	15	414 61
October,	13,309	1,585	158	6	337 39
November,	8,974	1,289	161	3	253 67
December,	9,341	1,564	118	10	263 63
January,	11,224	1,485	783	1	416 61
February,	9,565	1,637	707	2	345 08
March,	12,231	2,044	152	2	542 98
April,	9,754	1,612	112	2	280 40
May,	12,320	1,561	99	4	323 01
June,	20,452	2,198	63	1	788 65
Total,	135,373	18,240	4,814	67	$4,506 56

In concluding the report of the Department, I feel that it is necessary to impress upon the administrative authorities the necessity of sufficient financial support to discharge properly the varied obligations and responsibilities vested in us by the State. We have endeavored to co-ordinate all our activities and eliminate duplication. Nevertheless, the work of the various Bureaus taxes the entire force to its utmost in maintaining the degree of efficiency we desire.

The business standards of today demand a type of service on the part of State Departments of a high order, and it is the ambition of the Department to be in a position to furnish such expert advice on the various phases of our work as are from time to time desired by the employers of the State.

We are pledged to the duty of promoting and maintaining the economic and social stability of productive organizations upon whose successful administration depends the welfare of each employer and employee.

In a period admittedly fraught with the elements of unrest and financial hazard, there is need for the most effective State co-operation in furthering the Department's policy of industrial conservation and the stabilizing of the labor force.

Yours respectfully,

LEWIS T. BRYANT,

Commissioner of Labor.

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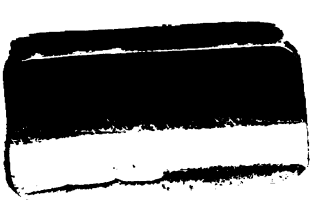

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